THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. MAY 12, 1898. CHICAGO, ILL. NUMBER 19

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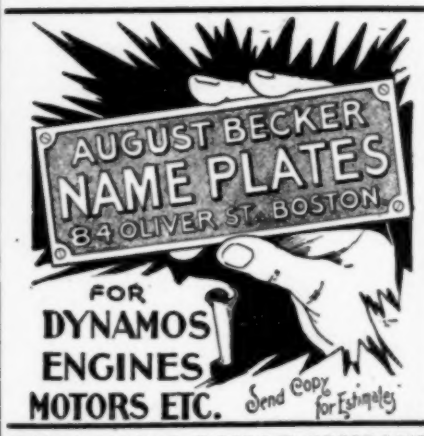

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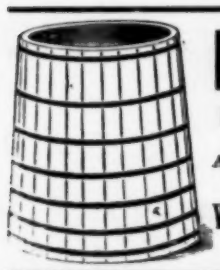

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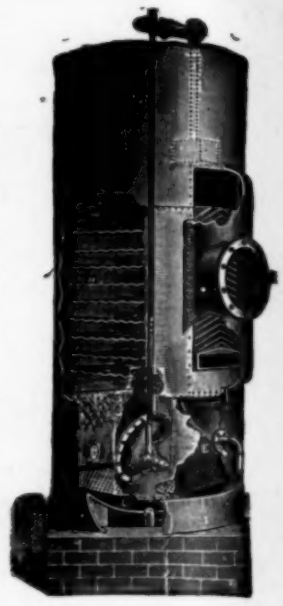

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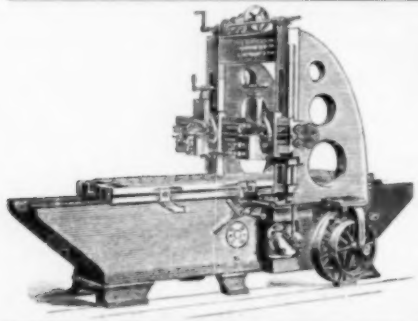

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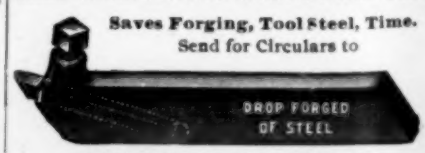

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. MAY 12, 1898. CHICAGO, ILL. NUMBER 19

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The iron trade is controlled for the moment by the feeling that whatever is lacking of sufficient new business to equal the shipments from the mills will be fully made up and more, in the near future. The confident attitude of the entire trade is quite at variance with some predictions made a month ago, the course of the war thus far having made optimists of any who were doubting. Foreign business is suffering meantime and this fact may contribute something to stock accumulations. An Atlantic rate of 16 shillings and upward, or nearly three times that under which much of our iron and steel has gone abroad, is certain to be prohibitive. It is significant that British inquiries for plates should come in the midst of the good demand at this side. It would seem that the requirements on both sides of the water are exceptional. The cutting off of their export trade has not been a serious matter as yet for Alabama furnaces. Most of them are booked for months ahead on home business and full shipments are being taken for the most part. The sales of Southern iron in the past two weeks have been large and in many cases heavy buyers have made contracts, indicating a belief that the result of the expected early ending of the war will be higher prices. How far the restrictive movement contemplated by the plans of the National Association of Non-Bessemer Pig Iron Manufacturers will become a factor in prices cannot be told at once. It will take a little time to show whether producers will be so ready to pay the tonnage tax and assent to all the features of the organization as they were to be represented at a preliminary meeting for conference. The $10 furnace price of the Bessemer pig iron producers of the Central West has been established by valley sales of several thousand tons in the past week. At Pittsburg considerable business has been done, but the iron has been purchased from dealers at figures 25 to 30 cents below the producers' basis. It is estimated that the banking of certain valley furnaces, which has already begun, will produce an aggregate curtailment in the next 10 or 12 weeks, equal to a year's output of an average valley furnace, or about 85,000 tons. Meantime it is evident that if the present output of steel is to be maintained through the second quarter considerable purchases of Bessemer pig will be made. But just as the pig iron price is becoming established at a figure carrying a profit, billets have weakened and the spread that has been for a considerable period strongly in the steel maker's favor swings closer to normal. The sources of finished material demand, leaving structural steel out of the account, indicate that a season of fairly steady operation is ahead of the mills. Railroad, argicultural, Government and shipyard requirements are not only a tremendous present factor, but promise to be steady consumers for months to come. The agricultural demand resulting from the farmer's prosperity of last year, seems only fairly under way, and all calculations of implement makers for the coming year are much beyond those for 1898. In many cases not only will stocks be completely cleaned up this season, but shipments from works will fall short of filling orders. In several finished lines there is a noticeable shortage of new business, and in the case of sheets and bars a weaker feeling.

PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World.*
808 TRADESMEN'S BUILDING, May 11.

The victory at Manilla was temporarily effective in stirring up business and for a few days last week the change was noticeable. Bessemer pig sold heavily and finished material was particularly active. The pace has not been maintained since and, wherever buying can be delayed, that course is again the rule. Owing to delayed shipments, sheet bars for immediate use are much in demand and are higher in consequence.

PIG IRON.—For a week past Bessemer pig has been more active than at any time since the movement among furnacemen was inaugurated. The buying, which was scattered, brought out iron in outside hands in greater quantities than was expected and the furnaces holding to $10 at furnace have had no part in the Pittsburg selling. Spot shipments of Bessemer are quoted at $9.65, valley, and $9.75 for June delivery. A sale is also reported at $9.85. The valley furnaces are firm in asking $10.65, Pittsburg and Lorain, $10.10 Youngstown and New Castle, and $10 at furnace. Hazelton furnace went out of blast and Sharpsville was banked in the week. Good buying is reported in foundry irons but no higher prices. Gray forge is strong in the valleys at $8.85 and firm in Pittsburg at $9.25. Quotations in Pittsburg are as follows:

Bessemer, valley	$ 9.75 to	10.00
Bessemer, Pittsburg	10.40 to	10.65
No. 1 Foundry	10.40 to	10.50
No. 2 Foundry	9.90 to	10.00
No. 3 Foundry	9.50 to	9.75
Gray Forge, valley	8.75 to	8.85
Gray Forge, Pittsburg		9.25

STEEL.—Valley and Pittsburg mills are alike behind in sheet bar shipments and prompt steel is bringing a premium. Sheet bars are sold at $17 and $17.25, maker's mill and no prompt shipments are promised. Billets are selling at $15, maker's mill and are weak. Additional wire plants are idle and rods are not in demand. They are quoted at $20.75 and $21, maker's mill.

FERRO-MANGANESE.—The shortage in domestic is still pronounced and sellers are asking $49.50 and $50. Little is being sold.

BARS.—The two mills asking 1c for steel bars have weakened and 95c is generally asked and less has been accepted by more than one mill. Iron bars are in less demand than two weeks ago, and there is a general scramble for tonnage. Valley quotations are 95c. Branded muck bar iron is quoted from 1.25c, up.

SPELTER.—The move in spelter is over and prime western is weak at $4.10 and $4.12½.

STRUCTURAL MATERIAL.—Large contracts held up by the war increase in number with every week. A 3,000-ton order for track elevation in Buffalo was to have been awarded today but is postponed till fall. The general contract has been let for the new court house at Washington, Pa., but the steel is not formally awarded. The 600 tons will probably come to a Pittsburg mill. Buying on contract continues heavy but new work and inquiry are correspondingly light. So far there is no complaint of the workings of the pool. A called

meeting, however, of the six parties to the agreement is to be held this week at the Hotel Waldorf, New York. Pool quotations are as follows: Beams and channels, 3 to 15 inches, 1.15c; 18 to 24 inches, 1.25c; tees, 1.20c; zees, 1.15c, and angles, 1.05c. Universal plates in connection with shapes are selling at 1c; alone, at 1.10c.

SPIEGEL.—Spiegel is quoted at $23.50 and $24.

IRON AND STEEL SKELP.—Some good sales in skelp have been made lately at somewhat lower prices. Mills quote skelp as follows: Steel, grooved, 97½c to 1c; sheared, 1 05c to 1.07½c; iron, grooved, 1.05c to 1.07½c; sheared, 1.12½c to 1.15c.

RAILS AND TRACK MATERIAL.—Rails are quiet at $18, Pittsburg, and track material is quoted as follows: Iron trackbolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.20c.

SHEETS.—The effect of the war is very noticeable in sheets. Buying is much below even lean years and mills cannot get specifications on what orders they have. Many of the smaller ones are idle, refusing to sell for the last half of the year. Tonnage of this sort can be had if taken on a basis of 1.95c for No. 28—the prices ruling today. Galvanized are weak and selling at 80 and 7½ per cent off list.

PLATES.—Specifications on the steel car and ship plate orders taken a month ago are coming in now and half the mills are running full. The current orders are largely on contract but the volume gives no indications of lessening. The new quotations are being rigidly held. Mills quote: Tank, ¼-inch and heavier, 1.10c; shell, 1.20c; flange, 1.25c; fire box, 2c and upwards.

PIPES AND TUBES.—Because of the war the pipe manufacturers at their meeting last week decided to continue the quotations of six tens and five per cent for the present. The mills without exception reported much buying delayed by national affairs and an advance now was deemed useless. A revision of jobbers' terms was made which becomes effective at once. Base discounts, which are continued are as follows: Butt weld, black, 57 per cent off; lap weld, black, 67 per cent off; butt weld, galvanized, 50 per cent off; lap weld, galvanized, 55 per cent off. Discounts on merchant boiler tubes are as follows: 2¼ inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off. The buying is still confined to small sizes of pipe.

OLD MATERIAL.—The largest sales of old material in the week were of iron rails, three lots of 1,000 tons being sold and each lot bringing $13.75, Pittsburg. A sale of 500 tons of old steel rails was made at $10.50 and one of 200 is reported at $10.75. Other prices made were: Car wheels, Pittsburg, $10.25, gross; heavy melting stock, $10.75, gross; cast borings, $5.75; billet and bloom ends, run of mill, $11; wrought turnings, $7.50, gross; busheling scrap, $9.50, net; machine scrap, $9, gross; wrought scrap, $11.50, net; No. 1 cast, $9 25, gross; cast borings, $6, net.

CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.*
1142 MONADNOCK BLOCK, May 11.

Sales of iron and steel were hardly as large last weeek as in the week previous, but were still satisfactory, and the demand appears to be fully as large as at any time in two months, for most classes of materials. Some large buyers in this market have expressed the opinion that this will be the year of largest consumption of iron in the country's history, and that as soon as the war with Spain is ended the market will see a strong boom, with heavy sales and higher prices. A large buyer here has recently had reports from his agents in all part of this country and abroad regarding the outlook for his products—agricultural implements—during the coming season In consequence of the advices, he is making preparations for the largest output he has ever had. It seems to be the general opinion that one result of the war will be to make the Government a large buyer of all kinds of materials in the next few years, in order to put the fighting forces of the nation on the best possible footing, and that the railroads, as a consequence of the situation, in the wheat market, will also make great improvements in tracks and rolling stock, all of which, with the general trade on the upward trend, will cause a very decided enlargement in production and consumption of iron and steel.

PIG IRON.—Local furnaces had a quiet week, with comparatively small sales. They are so full of orders reaching so far ahead that they are accepting only small contracts, and hold for full prices on all business they take. The Southern furnaces had considerable business last week, probably in excess of 10,000 tons. One sale was for over 2,000 tons, three for 1,500 each, and several for 1,000 and 500 tons each, while the small lot business was excellent. There is still considerable demand unsatisfied. A large number of smaller implement manufacturers have not yet placed their business for the coming season, but are expected to be in the market soon. Prices are firm and furnaces outside of the combination are said not to be cutting to any extent. The foundries in this district continue to run full, and most of them believe their business will hold up well in the immediate future. The only exception is the architectuarl foundries, who report only a small demand. We quote:

Lake Sup. Charcoal	$11 50@12 00	South'n Coke No. 3	$10 10@10 35
Local Coke Fdy. No. 1	11 50@12 00	Southern No. 1 Soft	10 60@10 85
Local Coke Fdy. No. 2	11 00@11 50	Southern No. 2 Soft	10 35@10 60
Local Coke Fdy. No. 3	10 75@11 00	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 75@11 00	Alabama Car Wheel	14 00@16 00
South'n Coke No. 1	10 60@10 85	Malleable Bessemer	11 50@12 00
South'n Coke No. 2	10 35@10 60	Coke Bessemer	11 50@12 00

BARS.—There are inquiries in the market at present for over 35,000 tons of bar iron and steel, from all classes of consumers, and the larger part of it may be placed before the end of the month. Implement manufacturers are figuring on their needs, and many will buy more than ever, while it is not likely that any will buy less. In the past week several good contracts have been closed, including one or two from implement makers, and several from car works. The mills are not anxious to book far into the future, and some buyers desiring to make contracts nine months or more ahead have been unsuccessful. The market is firm, and higher prices may be announced at any time. Some mills are trying to obtain more money now, and in one or two instances have succeeded. Common iron is quoted at 1.05c to 1.10c; guaranteed, 1.10c to 1.15c; soft steel bars, 1.15c to 1.20c.

RAILS AND TRACK SUPPLIES.—The market is quiet, and sales last week were limited to small lots for immediate delivery. Quotations are as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.15c to 1.25c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.50c to 1.60c.

BILLETS AND RODS.—No sales are reported by the local mills last week, and sales by outside concerns were small. The market is nominal at $16.50 to $17 for billets, and $23.25 to $23.75 for rods.

CAR ORDERS.—Two or three large contracts for cars are reported for the week, but it is impossible to obtain the particulars. At any rate, several good contracts for material—axles, bars, etc.—were placed, and further business is being figured on.

STRUCTURAL MATERIAL.—No large contracts were placed and no new business of large size came up to be bid upon. The general business in small lots was excellent, and bids fair to keep up. The market is very firm, although no changes have been made in quotations, which are as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.20c to 1.25c; plates, 1.15c to 1.20c; tees, 1.35c to 1.40c. Small lots from stock are quoted at ¼ to ½ cent higher.

PLATES.—Several good contracts for plates were given out, aggregating probably over 4,000 tons, and further business is in prospect. Small order business was good, both from mill and from store, and the demand is excellent. Prices are made as follows: Tank steel, 1.15c to 1.20c; flange steel, 1.20c to 1.40c; fire box steel, 1.85c to 5c.

SHEETS.—Business continues to be good, and sales in both large and small lots last week were very satisfactory to the dealers. The demand appears to be increasing somewhat, and the inquiries in hand denote a good business in the immediate future. Quotations are made at 2c to 2.10c for No. 27, black, and 80 and 10 per cent discount for galvanized.

MERCHANT STEEL.—Several large contracts were closed last week by implement makers, who are expected to be larger buyers this year than ever before. General business is also good, and sales last week were quite large, and are expected to be good for some time. Prices follow: Open-hearth spring, tire and machinery steel, 1.60c to 1.70c; smooth-finished ma-

chinery steel, 1.60c to 1.65c; smooth finished tire, 1.50c to 1.60c; tool steel, 5.50c to 7.50c; specials 11c and upwards

SCRAP.—Very little business was done last week, and there is not a large inquiry in the market at the present time. Dealer's selling prices are as follows:

Old iron rails, gross,	$12 00@$12 25	Axles, net	$14 25@$14 75
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 00@ 4 25
Old steel rails, short	9 00@ 9 25	Wrought turnings, net	5 50@ 6 00
Old wheels, gross	11 00@ 11 50	Axle turnings, net	6 25@ 6 75
Railroad forge, net	12 00@ 12 50	Mixed steel, gross,	7 25@ 7 50
Dealer's forge, net	10 50@ 11 00	Stove plates, net	6 00@ 6 25
No. 1 mill, net	7 50@ 8 00	Heavy melting steel, gr.	8 25@ 8 50
Heavy cast, net	8 50@ 9 00	Old iron splice b., net.	13 25@ 13 50
Malleable cast, net	8 00@ 8 50		

CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World.* }
27 VINCENT ST., May 11. }

Iron ore buying, with the season barely opened, is quiet and may be so for weeks to come, when compared with other years, when the uncertainties of the trade and the prominence of its vessel features, were such as to keep buyer and seller on the qui vive. The iron ore business more and more is cut and dried, and mid-season sensations will be fewer and fewer. Barring some Mesabi trades which have strings to them, there is little activity for the past week. Interest will center in the outcome of the Mesabi situation. A good tonnage is well assured but the price is a matter on which the last word has not yet been said. The figures given elsewhere show that 3,167,000 tons of ore was on Lake Erie docks, May 1, taking no account of 1898 cargoes which are carried into the May record. This is about 100,000 tons less than the total one year ago and tallies with expectations. Statistics show an enormous movement of ore over Lake Erie docks in the past year—more than 10,000,000 tons—the best record being quite exceeded. April showed an unusual amount of ore brought down, yet vesselmen have been hunting for cargoes, while a car scarcity at lower lake docks has been complained of, these conditions going to show that with the low and stable rates of lake freight now prevailing and the enormous capacity afloat, a tremendous business may be done and yet the vessel interest have all the time the aspect of depression.

PIG IRON.—The furnacemen's price on Bessemer iron appears to have been established by sales of several thousand tons in the week, netting the furnace $10. One Shenango valley furnace has ceased operations and will be inactive for at least 30 days. The result of other movements of the kind which are likely to come in the next few months, will probably be a curtailment of 75,000 to 100,000 tons in the supply of Bessemer iron. The result promises to be what furnacemen count on—a strengthening of the market and the elimination in larger measure than before, of the speculative element from the Bessemer market. The foundry iron market has been without change. The amount of buying in farther Western districts and the well sold condition of Southern and Chicago local furnaces gives promise of more freedom to the Central Western district from distant competition, than was the case last year. The navigation season brings a good movement in charcoal iron, stocks of which at lower lake ports were quite cleaned up in the winter. Forge iron is quoted $8.75 in the valley. Hazelton funace has blown out in the week and Hubbard No. 1 has gone in again. Sharpsville furnace has banked and will be idle at least 30 days. River Furnace, Cleveland, has resumed and is now on Bessemer iron. It is expected that there will be no interruption in the next few months, in the operation of the Emma and River Furnaces, Cleveland, and the Penn Iron & Coal Co.'s furnace at Canal Dover. Corrigan, McKinney & Co., surrendered Douglas Furnace, at Sharpsville, May 1, on the expiration of their lease. The furnace is in the hands of the Carnegie Steel Co., Ltd., pending the payment to it of the old Pierce, Kelly & Co. indebtedness, but there is no present expectation of starting it up. Its capacity is 200 tons a day. We quote f. o. b. Cleveland:

Bessemer, second quarter	$10 65	Valley Scotch No. 1	$10 65@$10 75
No. 1 Strong Foundry	10 65	Valley Scotch No. 2	10 25@10 40
No. 2 Strong Foundry	10 15@10 40	Gray Forge	9 40
No. 3 Foundry	9 65	Lake Superior Charcoal	11 50

FINISHED MATERIAL.—The eight-story Schlather building is the only new development in structural steel. There will be about 1,000 tons of steel but it has not been placed as yet. The market for bars is weak, and prices on steel bars are again below 95c, Pittsburg; 95c has been the valley basis on iron in car lots, also. Boiler works are reported quite busy, and both plates and tubes are entering largely into current consumption. Plate business is light under the firm quotations of the mills and their well filled condition. Buyers and sellers both are willing to await developments. There is somewhat more activity in wire and nails, and recent low quotations by a producer of small capacity have not affected the policy of the important interests. Prices are being maintained on the basis agreed upon at Pittsburg recently: $1.15 for smooth and $1.65 for barbed wire, and $1.30 for wire nails. Jobbers are ordering with a little more freedom.

OLD MATERIAL.—The local market has held an even pace in recent weeks. Somewhat more activity is reported from Pittsburg, but valley mills are only moderate buyers. We quote old iron rails at $13.50, old steel rails at $10; old car wheels, $11; No. 1 railroad wrought scrap, $11; machine cast scrap, $8.25; mill scrap, $8.50.

CINCINNATI.

May 10.

Southern iron masters certainly have little reason to complain of the situation in pig iron. Shipments are being made from Southern furnaces in a most satisfactory way; in fact, on many grades of soft irons it is almost impossible to make shipments as fast as contracts call for them. The volume of new business is large and inquiries are keeping up so that as yet there is no diminution in the demand. It has been so large and comprehensive as to variety, indeed, that a great deal of warrant iron, some outside lots and off grades have been taken off the market, clearing the way for regular supply of standard grades of furnace irons. In consequence of the large business, prices are firmer and there is not that disposition to cut nor the occasion for it that prevailed in the near past. The opinion seems to prevail generally, that the war will not seriously interrupt domestic business, and while our large export trade in raw and manufactured articles is about paralyzed for the present, the triumph which must come in the early future will give the country greater prominence among the nations of the earth, and the interruption of foreign business be more than compensated for in expanded trade hereafter. We quote for cash f. o. b. Cincinnati: Southern coke, No. 1 foundry, $9.75; No. 2, $9.50; No. 3, $9.25; gray forge, $8.75; mottled, $8.75; No. 1 soft, $9.75 to $10; No. 2, $9.50 to $9.75; Belfont coke, No. 1, Lake Superior, $11 to $11.50; Belfont coke, No. 2, Lake Superior, $10.50 to $10.75; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Tennessee charcoal, No. 1, $12.50 to $13; Jackson Co. silvery, No. 1, $12.50 to $13; Standard Georgia car wheel, $14.25 to $15.

PHILADELPHIA.

May 9.

New business in iron and steel comes up slowly. Confidence is strong and the refusal of the business and manufacturing interests to take alarm from the war is carrying operations on at a rate which would have been regarded a year ago as veritable prosperity. The pig iron market shows a fair amount of activity but prices are as low as at any time since the opening of the year. The committee of the National Association of non-Bessemer Pig Iron Manufacturers had a meeting in this city with Secretary Birkinbine of the association on the 6th, to perfect the organization. Statistical arrangements are a minor detail. One of the first moves, after the tonnage assessments have been made, will be to receive bids from furnaces willing to go out of blast for a time. It remains to be seen whether the novel features of the plan for preventing surplus can be made practically and advantageously effective. There is no change in quotations from the basis of $10.75 and somewhat less for No. 2 plain and $10 for mill iron. Somewhat more inquiry for billets is noted and views are represented by $17 offered and $17.25 quoted, the weaker prices at Pittsburg making buyers indisposed to pay the latter figure. The home demand for plates for the plentiful shipyard work recently reported is augmented by some foreign demand; but ocean freights are now so high—$4 and upwards, as against $1.50 in ordinary times—that foreign buyers will have to bid up to get material now. It is evident that foreign shipyard business is exceptionally brisk, too. There is still a weak market in bars, and structural work is of moderate proportions, new business in this line being in small lots. Refined bars are quoted 1.10c; soft steel bars, 1.10c to 1.15c; common iron bars, 1.05c; plates, 1.20c to 1.25c; angles, 1.20c; beams and channels, up to 15 inches, 1.30c.

THE IRON TRADE REVIEW
AND
INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

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ONE OF THE INTANGIBLE ASSETS.

A familiar fact in business is the marked individuality of certain concerns, as shown in their departures in one way and another, from practices that obtain in the trade with which they are identified. Dating from the days when the stamp of one man, the original proprietor, was visible upon all the operations of the firm, this marked individuality has been perpetuated in some cases even after a great impersonal corporation has succeeded the days of direct personal oversight by the controlling mind. While it may be a matter not greatly studied—certainly not as much studied as it should be—it will be found that fairness or unfairness, courtesy or discourtesy, fine sense of honor or a disposition to overreach and override, are elements that are being constantly weighed in the general judgment made up by the trade concerning firms regarded as important factors in it. We have in mind concerns in the iron and steel world of whom the general verdict of the trade is unfavorable, because their dealings are marked by arbitrariness, disregard of the rights of others, and inability to appreciate the view-point of one whose interest may not be identical with their own. Others there are whose reputation has been made by a nice attention to the amenities and courtesies of business, and whose every dealing gives such an impression of fairness, squareness and broadmindedness as to win and hold friends.

It is said by those who follow the other policy that price and quality determine the destination of an order. This is not true. Firms that have educated themselves to think that exclusive production of a certain grade or style of product makes even unfriendly or unwilling buyers come to them, have been surprised to find how customers, tiring of arrogance and indifference, have found other goods that satisfied their wants, even at the cost of inconvenience or larger outlay.

A demonstration of the value of courtesy and friendliness in business is found in the career of an important concern following a single line of iron and steel manufacture, whose excellent standing in the trade has been attributed largely to the treatment accorded all who do business with it. Its characteristic courtesy is shown by every officer and attache of the company from office boy up. The first symptom of pertness or curtness on the part of any office employe toward any person entering the establishment, be he solicitor or valued customer, is promptly rebuked; and if the habit of the house cannot be acquired by any of its subordinates, his connection is not prolonged.

It is common experience that incivility in business is more likely to come from employes lowest in position and attainment. Recognizing the consequences of such discourtesy, one concern whose position is secure enough on the score of resources and of ability to make low prices, goes to the extreme of carefulness. It is not an unusual experience, in communicating by telephone with a large establishment to be curtly told that the wrong department has been called and to be directed with some impatience to the correct number. The company in question insists that every call by telephone be answered with utmost courtesy, and further that if by mistake the wrong department is called up, the message is to be taken down with precision and communicated to the department for which it was intended.

These seemingly trivial examples are cited simply in illustration of the point that some concerns which have attained positions of seeming independence may owe more than many men of the "strictly business" type can discover, to the fact that they are past masters in the art of business courtesy. We are inditing no homily on the etiquette of business intercourse, but simply started out to suggest that there may be establishments which for lack of proper industry in the training of subordinates are acquiring a reputation that may prove an undeserved plague.

ONE MACHINERY SALESMAN'S "METHOD."

I was in an Ohio town recently, trying to sell machinery (they do the sort of thing about to be described, as well as some others, very neatly in Ohio, anyhow); and one man took a great interest in my story and sent for samples of all his work, to see what could be done with them on my machinery. At least that was the inference; but the conversation was soon switched around to methods of doing the work, in a general way. My machine was mentioned often enough to make matters interesting, and the man kept me there over an hour, getting the benefit of what I happen to know about the detail of manufacturing his kind of goods.

He didn't say he wanted any of my machinery, and he didn't say he didn't, either. I suppose he was afraid that if he said he didn't want any, I would go out, and then he wouldn't find out anything more of what I know about his work; but if he had known, he needn't have been in the least alarmed, as I meant to stay and answer questions as long as he wished.

In the first place I was so struck with the clever way in which he conducted the conversation, that I would have stayed and told him all I knew out of pure admiration for his diplomacy. I knew that he didn't want any of my machinery, and still I enjoyed giving him free information.

Now, why did I give so much of my time, or, more strictly speaking, the time of the concern by which I am employed, to this man, particularly when there were several others concerns that I wanted to call on that afternoon, and get out of town by evening?

I said above that I enjoyed it, which is true; but, being employed by a manufacturing company, I should not have felt justified in squandering any time simply for my own pleasure. But here is the point: A man who is sharp enough to get out of me for nothing what he would need to pay good wages to a man for otherwise, is also sharp enough to know a good thing when he sees it. My machinery is a good thing; and if I can give him some good ideas regarding his work in a general way, he is more apt to believe what I tell him about my machinery. He is also, to a certain extent, under obligations to me for the information given, and no one likes to be under obligations to another (the exceptions to this are not worth considering).

This man will "get even" with me somehow and some time, even if he does it unconsciously. Some time, when he wants some new machinery, he will say to himself (perhaps still unconsciously): "Now, there is 'Scrutator;' he seems to understand this business pretty well. I have never seen any of his machinery, it is true, but I will take my chances on it sooner than on some that is sold by that other fellow, who doesn't seem to know anything about manufacturing, anyhow, or if he does, he won't tell." Or, if some one should chance to ask him what he knows about "Scrutator's" machinery, wouldn't he be likely to say something like this:

"I never saw any of his machinery; but I have seen him, and he seems to know his business, and isn't afraid to tell what he knows. So I guess you will be safe in dealing with him."

This is not mere theory; I have had it work just like this before, and I am not sorry that I gave the man the time and the information. SCRUTATOR.

A RECENT strike of riveters' in the yards of the Chicago Ship Building Co. illustrates the mistaken attitude now and then assumed by labor organizations toward labor-saving improvements. Where the unions have felt strong enough to enforce their schedules, they have now and again attached a penalty to the operation of some form of machine by establishing a very high wage for the operator. This was the real point at issue in the Homestead strike of 1892. Time has been required to overcome these antagonisms, but in general organized labor has accepted the machine as an inevitable feature of the modern industrial movement and has squared its practice to the facts as it finds them. In the case of the Chicago strikers there is an inconsistency in the attitude of the men at the beginning. The company had been using pneumatic riveters for two years but only on certain parts of the work, mostly inside. Recently the company completed a machine for driving shell rivets, that is, rivets with countersunk flush points, probably the first machine of the kind ever used. The shell riveters, being the most expert class and receiving the highest pay, had not been exercised over the introduction of riveting machines on inside work—their idea being, probably, that machines could not be perfected so as to do the shell work. On the introduction of the new machine the strike came, and the Brotherhood of Boiler Makers and Iron Ship Builders assumed charge of the matter. It need hardly be said that the union has made a mistake in thinking to stop the advance of the machine into any avenue of employment, no matter how select may have been the circle of hand workmen heretofore occupying it. The seeming hardships of the machine regime are a matter of familiar discussion; but good or ill—we shall not say all good—the machine is a larger factor with every day, and it is useless to kick against the pricks.

IN connection with an enumeration of the car loading machinery on the various Lake Erie docks —17 plants, estimated to cost $600,000—the *Marine Review* points out that reductions in the price of coal in the Northwest are resulting. Not only is the cost of loading greatly reduced, but as car dump machines can put 4,000 tons on board a boat in 10 hours, as against two or three days, under old methods, the lake freight is lowered by the improved dispatch. With loading machinery at Lake Erie docks and unloading machinery at upper lake ports, the dispatch is such that coal is carried to the head of Lake Superior at 20 cents a ton, as against a ruling rate of 50 cents a few years ago, and then considered ruinously low. Big steel vessels, triple-expansion engines and wonderful improvements in handling machinery for ore and coal, have wrought marvels in cheapening the cost of lake carrying in the past decade. Yet in the minds of certain well-meaning but misguided citizens who asked for control of Government affairs in 1896 on the strength of their remarkable discovery, all these achievements have been for nothing, and the whole difference in cost to the consumer has been due to the crime of '73 and its depreciation of silver.

THE New York offices of the Carnegie Steel Co. Ltd., and of the H. C. Frick Coke Co., have been removed to the new Empire Bldg., 71 Broadway. A. R. Whitney & Co., the New York sales agents for the structural shapes of the Carnegie Steel Co., Ltd., have taken adjoining offices in the same bnilding.

THROUGH an error in the types a misleading sentence was incorporated in the article in our April 28 issue describing the improved tube-making machinery devised by Walter Gregg, J. F. Donaghy and John Humphrey, of the Ellwood City, Pa., plant of the Shelby Steel Tube Co. The statement that the invention "makes necessary the employment of hydraulic or other means to force the billet forward while being rotated," is just the opposite of the fact. The improved construction makes such apparatus unnecessary.

THE Norwalk Foundry & Machine Co., Norwalk, O., manufacturer of theNorwalk steam engine governor, has acquired the right for the State of Ohio, with the exception of Cuyahoga county, for the manufacture of the Patterson acetylene gas generators.

PIG IRON CASTING PLANT.

Furnacemen are familiar with the Uehling casting and conveying apparatus, which has been introduced at a number of furnaces in this country and in Great Britain and has proved under use to be even more advantageous than its early operations indicated. Numerous other efforts have been made to dispense with sand molds and to facilitate the handling of iron from the furnace. The result of one of them is the metal casting plant devised by David Baker, of Sparrow's Point, Md. An apparatus has also been experimented with at the furnaces in the Chicago district. Mr. Baker's machine, which we illustrate, is designed for the casting and handling of metals generally, but its immediate applications to pig iron. The general plan, as will be seen, is a traveling ladle, taken to a bed of metallic molds, in which the molten iron is poured, and below the mold beds a trough into which the pigs are discharged, thence, after being sprayed to cool them, dropping into cars. It will be seen that there is no conveying apparatus, and that the mold-beds do not travel, though each set turns on an axis, bringing a new set under the pouring receptacle. A top plan view in Fig. 1, a sectional elevation in Fig. 2 and a front elevation in Fig. 3 are shown. Fig. 4 is an elevation on an enlarged scale of the mechanism for tilting the mold-beds to discharge the castings.

Adjoining the track on which the iron is brought to the molds in a ladle-car, and at a lower level are vertical columns 4, from which a series of horizontal mold-beds 5 is supported in such position that the molten metal may be poured into the molds as the ladle is moved along the track. Receiving troughs 6 are supported below the mold-beds; into these the cast metal is delivered and from them it is dropped into cars. The ladle is so mounted on its truck that it may be tipped on a horizontal longitudinal axis. The forward trunnion of the ladle is extended beyond its bearing and is provided with a worm wheel 14. The electro-motor 21 and connected gearing revolve the worm so as to rotate the ladle in its trunnions. The car 18 is driven by a second motor 23. The motors may be supplied from a storage battery 50 or from a dynamo located at a distance.

When the ladle is tipped for pouring, the metal is received in a pouring-spout 25 sustained at the side of the truck by an arm 26. The molten metal received from the ladle flows from the mouth of the spout to the molds, as the motor car moves the ladle-truck slowly along the track.

The mold-beds 5 are arranged end to end at the side of the track slightly below its level, and each bed is provided with a series of non-communicating mold-cells 27 on its opposite sides, the construction being such that the mold-bed may be turned on a horizontal longitudinal axis to discharge the castings contained in the cells on one side, thus bringing into position the opposite cells. The mold-beds are turned by means of a lever 30, mounted loosely at one end on one of the trunnions 28 and carrying a spring-pawl 31, which engages a ratchet-wheel 32, fixed to the trunnion. The other end of the lever is jointed to a pitman, 33, which is extended inward and has its rear end jointed to a horizontal sliding head 34, mounted in guides 35 on the under side of the girder frame 29. This sliding head is connected to the end of a piston-rod 36, carrying a piston working in a hydraulic cylinder 37, fixed to the under side of the girder-frame beyond the guides. The relative size and arrangement of these parts are such that for every stroke of the piston the spring-sprawl engaging the ratchet-wheel will turn the mold-bed a quarter-revolution, the first stroke moving the bed to an upright position and the second stroke turning the mold-bed completely around, thereby discharging the castings and bringing the opposite cells into position to receive a supply of metal.

Fig. 1.

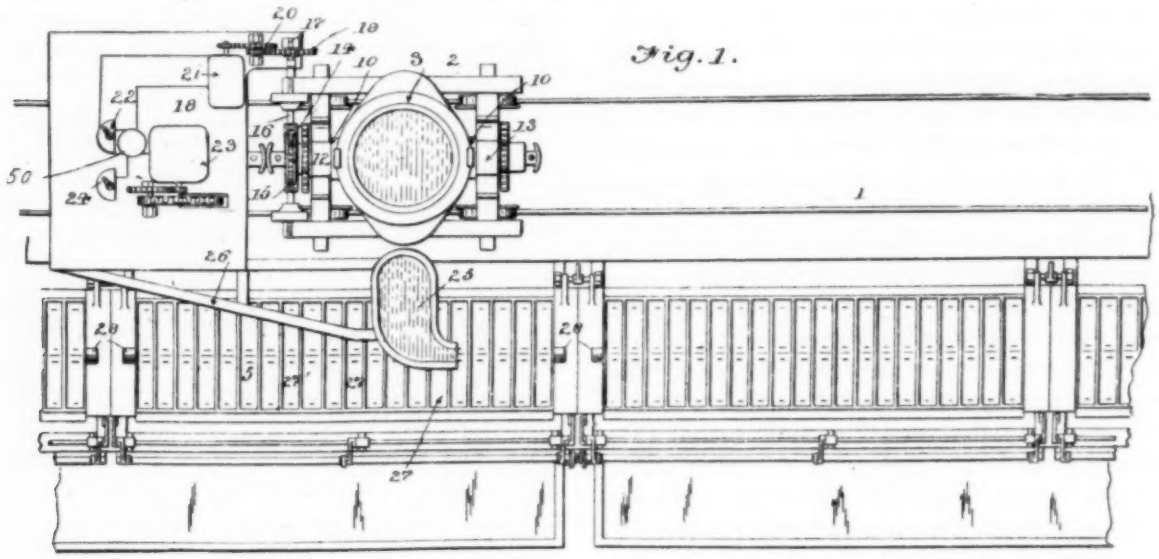
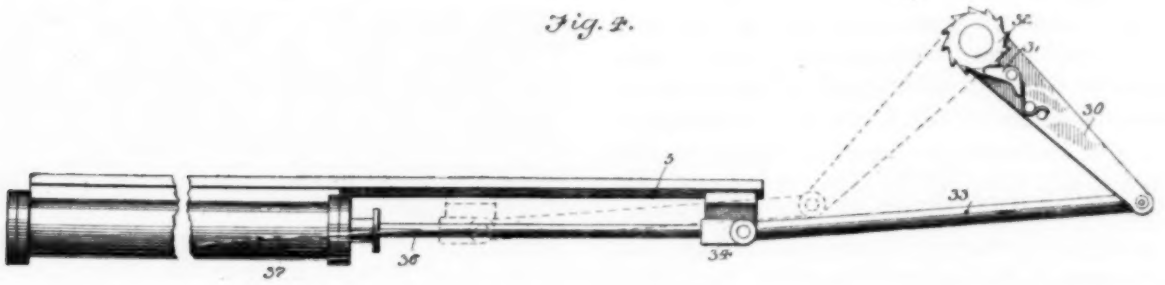


Fig. 4.



PIG IRON CASTING PLANT.

The troughs 6, into which the castings are discharged from the mold-bed, each consists of a downward-sloping floor 38, which has arranged on its lower edge a leaf 40, adapted to be held in an upwardly-inclined position, as shown in full lines in Fig. 2, in which position it will form a trough in connection with the sloping floor, and also adapted to be adjusted to a downwardly-inclined position, as shown in the dotted lines, in which position it will form a continuation of the sloping floor and will allow the castings to slide by gravity into the car. Proper mechanism is provided for controlling the movements of this leaf.

The ladle being filled with molten metal from the furnace, the motor-car and truck are started at one end of the track, and the attendant, by means of the motors, causes the ladle to be tipped on its trunnions, filling the pouring-spout with molten metal. The motor car then moves slowly over the track, carrying the ladle and pouring-spout along, and the metal flows from the pouring-spout into the successive mold-

cells. When the molds have all been filled and the metal hardened, the piston of the hydraulic cylinder 37 is operated and the mold-bed turned completely over, thereby discharging the iron into the trough beneath and bringing the opposite molds into position to receive a supply of metal. The castings in the trough are subjected to the action of the cooling-spray from the pipe 50, and when sufficiently cool the piston of the hydraulic cylinder 49 is operated, by which the leaf 40 is lowered, discharging the castings into the cars beneath. These operations may be repeated without interruption.

By providing a series of mold-beds arranged end to end, with means for tipping them independently, the beds may be successively filled, and by the time those at the end of the line have been filled, the others have had time to harden and may be tipped to discharge the castings and the opposite molds brought into position and ready to receive a supply of metal from the ladle, which in the meantime will have been returned to the head of the line. The operation may therefore be continuous, the ladle filling the cells in one bed while those previously filled are tilted to discharge the castings. In this way large quantities of metal may be handled with regularity, economy, and with little loss of scrap.

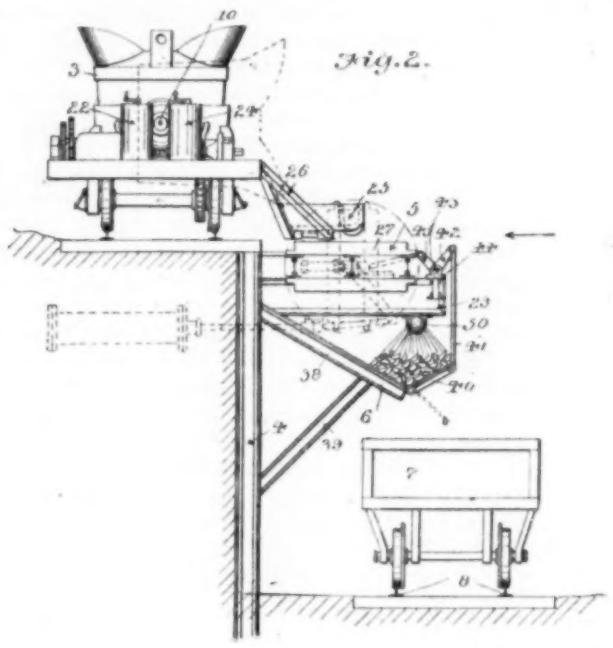


Fig. 2.

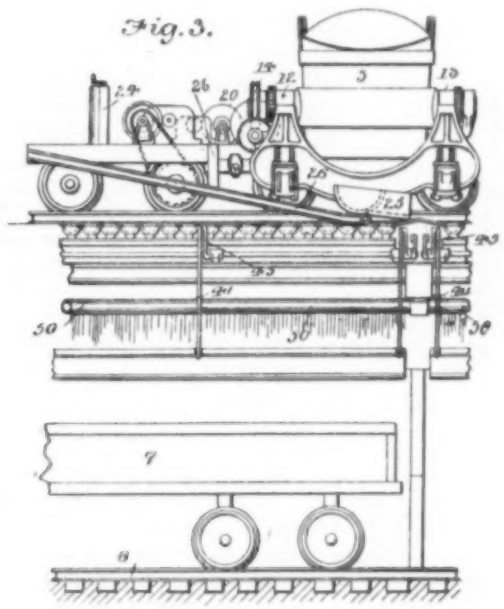


Fig. 3.

PIG IRON CASTING PLANT.

American Foundrymen's Association.

Owing to the meeting of the National Association of Stove Manufacturers, American Society of Mechanical Engineers, and the Master Car Builders' Association, which are held in May, the Cincinnati convention of the American Foundrymen's Association was appointed for June, falling on Tuesday, Wednesday, Thursday and Friday, June 7-10. The meeting will be at the Grand Hotel. It is expected that this will be even a larger convention than that at Detroit last year. Arrangements have been made for reduced railroad rates, tickets being good for two weeks. The following papers are announced: "A Modern Foundry," by A. W. Walker; "The Micro-Construction of Iron and Steel," by S. S. Knight; "The Adoption of a Standard System of Test Bars for Cast Iron," by Dr. Richard Moldenke; "A Talk on Brass Founding," by Chas. Vickers; "Manganese in Cast Iron," by Guy R. Johnson; "The Overhead Trolley Track," by H. M. Ramp; "Necessity of Well Mixed Furnace Casts and Correct Reports of Analysis," by Thos. D. West; "The Manufacture of Steel Castings," by Stewart Johnson; "A Test for Determining the Hardness of Cast Iron," by C. A. Bauer.

Received from the Trade.

The Chicago Retort & Fire Brick Co., 45th and Clark sts., Chicago, manufacturer of fire clay goods, has sent out to the trade a very handsome war atlas with marginal index, and containing reproductions of the flags of all nations. The atlas will prove invaluable to any one desirous of following the course of the war with Spain.

A pamphlet has been issued, reprinting from the *Journal of the Franklin Institute* the paper of H. F. J. Porter, read before the Institute, on "Fatigue of Metal in Wrought Iron and Steel Forgings." It is freely illustrated with views of steel forging operations. The pamphlet will be sent on application, by the Bethlehem Iron Co., Bethlehem, Pa

A handy-pocket catalogue of molders' tools and foundry bellows is issued by Angell & Dobson, of Canastota, N. Y. The tools of this firm, which are illustrated and described in the pamphlet, are hand-forged of selected American steel and special care is taken as to temper and finish. A specialty is made of foundry bellows, the features of which are their large spread and the fact that calfskin is used as the covering. Drying and cracking are prevented and durability insured. A number of valuable foundry recipes are given.

War and the Foundry Trade.

At the May meeting of the Foundrymen's Association, at Philadelphia, Wednesday evening, May 4, there was an informal discussion of the effect of war on business and particularly on the foundry trade. Reports given by Philadelphia foundrymen and by members in attendance from Reading, Wilmington and Trenton and other outside points, indicated that foundries are doing more work than in years, though all reported that prices are no better. The amount of business on hand is commented on also by heavy machinery and engineering shops, so that there can be no doubt as to the volume, but the supply of raw material has been, and is, so great, that they can buy pig iron as low as ever, and they seem to think that foundry prices cannot be advanced unless there is an advance in raw material.

President Wanner, of the association, expressed the general feeling in the following: "The good effect of this war, after its termination, will be a more perfect union of all our people, probably less politics and more patriotism, the expenditure of large sums of money on the navy, the establishment of a merchant marine, a still larger foreign trade, and the realization of the fact that we are not only one of the greatest nations upon land, but also upon the seas, the restoration of complete confidence in the unity and conscious greatness of our people, and the bringing to them of plenty and prosperity for years to come."

J. B. Campbell and A. M. Cole, receivers of the J. C. McNeil Co., Akron, O., announce that the receivership is only temporary, but that meantime the authority of the court enables the receivers to continue the business fully and vigorously. This is being done under the former management and with the old employes. The company's boiler works are running to their full capacity and there has been no interruption.

The Berlin Iron Bridge Co., of East Berlin, Conn., have just completed a fireproof boiler house for the Hendey Machine Co., of Torrington, Conn.

ORE STOCKS ON DOCKS.

3,167,915 TONS AT LAKE ERIE PORTS MAY 1.

Figures furnished *The Iron Trade Review* directly from Lake Erie docks show that the amount of iron ore at lower lake ports May 1 was slightly less than the record-breaking total for 1897. The aggregate is 3,167,915 gross tons, as against 3,256,497 tons May 1, 1897, and 1,949,698 tons in 1896. In getting the figures below, dock superintendents were asked to disregard any ore put on dock this year, so that the statement does not include the 1898 ore that was put on some of the docks in April. The table shows stocks on docks on May 1, in 1896, 1897 and 1898, by ports, with the amount on dock at the close of navigation in 1895, 1896 and 1897:

Ports.	CLOSE OF NAVIGATION.			OPENING OF NAVIGATION.		
	Dec. 1, 1895.	Dec. 1, 1896.	Dec. 1, 1897.	May 1, 1896.	May 1, 1897.	May 1, 1898.
Toledo	113,132	115,959	194,644	10,593	66,337	71,726
Sandusky	34,375	59,491	84,786	8,442	48,937	48,800
Huron	101,000	200,075	230,029	55,173	162,292	143,170
Lorain	224,264	231,288	317,509	118,820	180,615	158,797
Cleveland	1,200,792	1,419,311	1,478,355	506 693	979,703	853,776
Fairport	605,470	773,905	825,312	346,847	480,984	501,592
Ashtabula	1,301,302	1,441,666	1,835,694	636,254	926,865	1,031,441
Conneaut	292,460	275,800	360,895	112,406	207,034	69,047
Erie	335,718	355,222	484,871	137,826	153,261	236,485
Buffalo	207,199	82,267	111,660	16,644	50,477	53,081
Total	4,415,712	4,954,984	5,923,755	1,949,698	3,256,497	3,167,915

The total rail shipments from Lake Erie ports to furnaces in the winter of 1897-8 appear by comparing dock stocks Dec. 1, 1897, and May 1, 1898:

	Gross tons.
On dock at Lake Erie ports, Dec. 1, 1897,	5,923,755
On dock May 1, 1898,	3,167,915
By rail to furnaces in the winter of 1897-8,	2,755,840

The shipments to furnaces in the seven months from May 1 to Dec. 1, 1897, together with the consumption by furnaces at Tonawanda, Buffalo and Cleveland, receiving ore direct into their yards from vessels, amounted to 7,453,648 gross tons. Thus the total shipments from Lake Erie ports to furnaces in the year ending May 1, 1898, were 10,209.488 gross tons. These shipments in the past eight years have been as follows:

Year Ending—	Gross tons.	Year Ending—	Gross tons.
May 1, 1898	10,209,488	May 1, 1894	4 840,488
May 1, 1897	6,719,633	May 1, 1893	6.102,125
May 1, 1896	8,805,510	May 1, 1892	5,802,496
May 1, 1895	6,297,215	May 1, 1891	5,148,669

The statement of winter shipments for 12 years is as follows in gross tons:

1897-8	2,755,840	1893-4	1,482,340	1889-90	1,670,878
1896-7	1,698,487	1892-3	2,053,654	1888-9	1,289,802
1895-6	2,466,014	1891-2	1,971,301	1887-8	855,141
1894-5	2,191 267	1890-1	1,231,264	1886-7	817,166

For comparison we append the record of iron ore stocks on docks at the opening of navigation, back to 1889:

Year.	Gross tons.	Year.	Gross tons.
1898	3,167,915	1893	2,095.797
1897	3,256,497	1892	1,537,188
1896	1,949,698	1891	2,662,223
1895	2,642,980	1890	936,228
1894	2,588,370	1889	558,753

Personal.

A. J. Barnes, cashier of the City Bank, Buffalo, has been elected vice-president and treasurer of the Union Iron Works, whose new furnace at Buffalo is nearing completion.

T. T. Wood, recently superintendent of the Belle City Malleable Iron Co., Racine Junction, Wis., has resigned his position witn that company and has organized a company in the same city to be known as the Lakeside Malleable Iron Co. The works will cover about three acres. Mr. Wood will be general manager.

E. W. Cross, formerly of Spang, Chalfant & Co., Pittsburg, was elected secretary last week of the wrought pipe manufacturers' association.

John K. Weir, assistant superintendent of the Mahoning Valley Iron Co., has resigned and has purchased an interest in a foundry in Wheeling.

FELIX R. BRUNOT, at one time an iron manufacturer of Pittsburg, died Monday, May 9, aged 78.

LAKE SUPERIOR IRON MINES.

The shipment of iron ore through the Sault Ste. Marie Canal in April was 252,066 gross tons, a remarkable record. Usually a few stray cargoes get out of Lake Superior in April and last year there was only one in that month—about 2,500 tons.

The new crusher which the Gates Iron Works of Chicago, are furnishing the Lake Superior Iron Co. will crush its hard ore to about egg size and will treat 150 to 200 tons an hour. It is expected to have the crusher in operation by July 1.

The new steel barge Maida, launched at the shipyard of American Steel Barge Co., West Superior, recently, is described by the *Marine Review* as a vessel capable of carrying about 6,400 net tons on 16½ feet draft. The Maida will be owned by the Minnesota Iron Co. Her dimensions are Length over all, 390 feet; length between perpendiculars, 376 feet; beam, 46 feet; molded depth, 26 feet; registered tonnage, 3,474.78 tons gross and 3,210.74 net.

A modification of a mining lease, executed by W. C. Yawkey, of Detroit, to the Franklin Iron Mining Co., covering lands in section 9, 58-17, has been filed in the office of the register of deeds, at Duluth. The changes provided for are that the royalty is reduced after May 1 from 35 to 21 cents a ton, and the minimum output will be 50,000 tons intstead of 100,000 tons. It is provided that in case ore sells for more than $2.75 per ton, delivered in Cleveland, the royalty will increase 3-20 of a cent for every cent over the above price.

Last week, according to *Iron Ore*, a portion of the surface at Cleveland Lake mine, at a point opposite the shaft, went down, letting a large quantity of mud into the mine workings. The area of broken ground on surface measures about 500x250 feet, this narrowing to much smaller limits where it enters the first level of the mine, the mud running to the center of the break, making a funnel-shaped depression upon surface. The drift leading to the South Angeline deposit is choked up, and the mud also found its way to the third level through a raise. It will require considerable labor and time to clean the mud from the levels.

At the Biwabik mine recent work has been directed to widening the cut. Stripping is going on rapidly, 250 men being employed.

The Duluth mine, after two years' idleness, will start up this month. The stripping of last season was sufficient to uncover the 100,000 tons sold for 1898.

The Swanzy mine, which is being operated by Tod, Stambaugh & Co., is now about opened and the force will be increased. The new double shaft has been completed. At its bottom a high-grade blue hematite ore was found, but it is not determined yet whether a new lens has been struck or, if so, what its extent is. Shipments will begin at an early day.

AT Columbus, O., May 10, the Supreme Court sustained the demurrer and dismissed the petition in the case of the State of Ohio ex rel. the Addyston Pipe & Steel Co. vs. the City of Cleveland. This was an action brought in mandamus to compel the City of Cleveland to award a contract claimed to have been entered into with the Addyston Pipe & Steel Co. It was disclosed in the argument that the contract had been approved by the board of control, and was signed by the director of public works, but failed of endorsement in the council, which wanted to favor a higher local bidder by re-advertising. It was claimed by the Addyston Pipe & Steel Co. that this failure of endorsement did not invalidate the contract. The decision of the court holds the contract to be illegal and the city will re-advertise for bids.

REPORTS concerning the acquisition of the Claire Furnace or any other valley furnace by the Carnegie Steel Co. are without foundation in fact. All evidently grow out of the termination of the lease of the Douglas Furnace on May 1 and its reversion to the control of the Carnegie Steel Co., which holds it pending the satisfaction of old indebtedness. It is not likely that the furnace, which has been idle for two years, will be started up at any early date.

LAUGHLIN & Co., Ltd., operating the Eliza Furnaces at Pittsburg, have granted their employes a voluntary advance of 10 per cent in wages.

Review of the Technical Press.

(Translations, Condensation and Comment expressly for The Iron Trade Review by Dr. Richard Moldenke.)

Metal Ties.—*Stahl und Eisen*, April 1, has a short summary of results obtained with steel ties on the St. Gothard Railway. The improvements made since 1880 have gradually turned the balance in favor of this class of track equipment, and in addition to this the expiration of the older patents has brought the first cost down to the bottom level. The St. Gotthard Railway has experimented with mild steel ties for 16 years, and the following data are published: The road was opened to traffic in 1882 and was then equipped with ties of oak, beach and fir. The first metal ties were laid at the end of the same year, and since 1886 they are used almost exclusively for renewals. At the present day there are only about 35 per cent of wooden ties left on this road. The actual cost of a tie, including laying and credit for the old material is $1.61 for the steel tie and $1.67 for the wooden, or three and a half per cent in favor of the steel tie, which weighs 163 lbs. The cost of maintenance is in favor of the steel tie after the first few years, and there is also less danger from lateral movement when proper end construction prevails. A number of difficulties were encountered at the start, the steel being too high in carbon, and the edges of the metal where punched developing a tendency to crack. With very mild steel, however, this trouble disappeared. On the open stretches the life of the steel tie can be said to equal that of the steel rail, but in tunnels the rusting is so serious that only 8 to 10 years of service can be counted upon, or no better results than are given by oak ties. A final advantage is the fact that even if steel ties should prove too high in first cost anywhere, they offer a security unapproached by the best wooden ties in the case of curves, combined with a much greater length of service.

Boiler Steel Ingots.—*The American Engineer, Car Builder and Railroad Journal* for May describes some experiments made at the Baldwin Locomotive Works recently, which brought out the cause of failure of some steel boiler plates. These plates had met the usual chemical and physical requirements but failed prematurely in service. A microscopical examination showed minute laminations due to the presence of blow holes and segregation in the ingots. To prove this more fully an ingot was ordered from each of six boiler steel makers. When cut in two, the surfaces exposed on being examined revealed the presence of blow holes in all of these ingots. One of the ingots, which was very long, was cut at the lower third of its length and showed up very well. Now in making boiler plate too much care cannot be taken in preparing an ingot free from blow holes, for with the constantly increasing boiler pressure now in use laminated plates made from spongy ingots would mean death and destruction in very short order. The conclusion derived is that boiler plates should be rolled from very large ingots from which very long crop ends have been cut off to avoid segregation and honey-combing.

Semi-Steel, So-Called. [*Digest of Physical Tests*, April.] Mr. A. E. Outerbridge, Jr., has a timely article on this anomaly among metallurgic products. Mixing cast iron with steel scrap undoubtedly gives a tougher resulting material, but it remains cast iron just the same. The carbon is somewhat reduced, leaving the crystals less separated by planes of weakness; yet as long as the line of division between steel and cast iron is not reached, or in other words, if the total carbon is over 1.50 per cent, the metal will exhibit all the characteristics of cast iron. Mr. West has shown that repeated remelting of steel in the cupola will eventually bring the material to a point where it becomes saturated with carbon. Sulphur also goes up, being absorbed from the coke, while silicon and manganese burn out. Mr. Outerbridge also brings this out fully, showing the necessity of having the pig iron high in silicon so that the resulting castings may be of service. To quote from his paper: "The simple fact is that the melting of steel with pig iron causes the steel to lose its identity completely, but the pig iron does not thus lose its characteristic qualities, and the resulting material is simply a strong, close grain cast iron which has neither chemical nor physical relation or resemblance to steel." Mr. Outerbridge now gives some interesting reminiscences of early trials of this kind, and then explains the structural differences of cast iron and cast steel, when poured into large and into small castings. The question of "medicines" added to some steel mixtures is now gone into and here the reviewer can sympathize with Mr. Outerbridge, for he has also had his patience and habitual good temper tried by "inventors" who as a rule are unable to read or write, and discourse volubly on the "nature, affinity and amalgamation," of irons as enhanced by their nostrums. When the influence called into play on the part of these people is such that a trial is allowed them, the writer helps them to get the best test bar possible with their medicine, he then places it in the testing machine, tells the inventor what the regular good results are, and requests a definite statement as to the improvement guaranteed. The test is now made, and the inventor invariably takes his hat and walks out a wiser man. Mr. Outerbridge concludes with a criticism of the voluminous and sometimes misleading literature now being brought out, and hopes that our knowledge of iron will soon be such that a discriminating weeding process may save us that which is valuable, to the exclusion of all the other mistaken deductions of amateurs.

Forging Presses. [*Stahl und Eisen*, April 1.]—Mr. R. M. Daelen has an article on the use of forging presses which contains a number of interesting points. The idea of replacing the hammer with a press is an old one and also accounts for the introduction of the roll. Forging with the steam hammer has been much improved, but the lack of uniformity in results has always caused a reversion to the forging press. This is especially true for the immense ingots now worked up for armor plate, etc. Furthermore, we are now required to change the physical structure of the material while working it. The large crystals found in the ingot must be changed to a comparatively fine grain while the metal is hot, in order to obtain the conditions of greatest tensile strength. If pressure is applied very evenly the product becomes very uniform in structure. The effect is gradually reduced toward the center of the block owing to internal friction, and this increases with the speed at which the pressure is applied. In forging, the pressure applied is regarded as sufficient when the ends of the block to be forged bulge out. However, in this case the area of the hammer head and the anvil block, as well as the depth of the impress, should be considered. There is little known about the proper proportions in these cases. Breaking down hot ingot iron requires a pressure of about seven tons per square inch. If the work handled by a steam hammer of small size is such that the blow is made to penetrate too deeply, the material will quickly show signs of hard usage, while in the case of the press, if the work is beyond its capacity, it will simply stop. The action of the steam hammer is such that the very suddenness of the blow causes an abnormal expansion of the outer layers of the block while the interior remains intact. A forging can certainly not be uniform when it has been alternately broken down and drawn out. It may be objected that forging by presses brings out the same characteristics in the finished product as hammering, but it can be said that the temptation of using high degrees of heat and many blows with light hammers is very great, and hence work is taken in hand which could never have been attempted. Mr. Daelen now describes some experiments made with an hydraulic press in which the water was put under high pressure by the direct application of steam instead of using pumps and an accumulator. The advantages of regulating the steam pressure instead of having two or three distinct stops in the water pressure as ordinarily produced is shown, and the paper concludes with a rough calculation of the cost of flowing steel by squeezing in the hydraulic press.

A BILL incorporating the National Association of Manufacturers was favorably reported to the Senate by the committee on manufacturers May 6. The objects of the association are stated to be to obtain concert of action in promoting the manufacturing industries and commerce of the country and to extend the facilities of transportation at home and abroad.

FATIGUE OF METAL IN WROUGHT IRON AND STEEL FORGINGS.

An address on the above subject, given before the Franklin Institute at Philadelphia by H. F. J. Porter, has been published in pamphlet form. In his introduction, Mr. Porter stated the case as it had been made up by average practice previous to the establishment of such facilities for the proper working of steel forgings as are found in the United States to-day. We reproduce this portion of the address below:

My connection with one of the large forges of the country has brought me for several years in contact with persons who use forgings of both iron and steel in their respective lines of business and in conversation with them I have frequently been surprised at the misconception that many of them have regarding the comparative properties of these metals and especially their ability to resist repeated stresses.

They tell me, for instance, that they prefer wrought iron to steel for the connecting-rods and crank pins of their engines, because steel, having no fiber, is brittle and snaps suddenly, while wrought iron, being fibrous, does not. They say that both iron and steel crystallize from shock, but that wrought iron, being tougher, will outlast steel in such service as is performed by piston-rods of steam hammers. They say that low carbon steel is softer than high carbon steel, and is, therefore, less bittle and not so apt to break in the forged parts of their machines. Most of these persons know better, but have not given the subject sufficient thought, or they would perceive that their statements are not consistent. They know that steel cannot at the same time be stronger than iron, and yet be more brittle.

There is not one of them who would advocate the use of the old "cut nail," which was made of iron in place of the "wire nail," which is made of steel. They all know, if they only call it to their minds, that all metals are crystalline, iron and steel among them, and those who have looked into the matter carefully, know that the fiber in wrought iron is due entirely to the slag which has been incorporated in it in the process of manufacture. Many of us have seen the laboratory experiment of passing chlorine gas through a glass tube containing a piece of wrought iron. We remember how the iron was dissolved out, leaving a skeleton of slag of the same shape as the piece of iron. Here and there in the interior of the skeleton could be seen accretions of slag which, imbedded in the original piece of iron, would have weakened it appreciably. Instead, therefore, of being an element of strength in wrought iron, the fiber, which is looked upon as adding strength, is evidence of an impurity which is a source of weakness. And yet this fibrous appearance is not a necessary characteristic of good wrought iron. Any blacksmith will break a bar of iron in such a manner as to cause either a fibrous or a crystalline fracture. Then, again, wrought iron may be so poorly manipulated in the puddling process that, if worked at too high a heat, a portion can become actually melted into steel, or, if at too low a heat, some of the cast iron from which it was made may remain in its original condition. In either case a crystalline structure would be shown in a fracture.

It was to the metallurgist almost alone, who knew the advantages of using a metal which has been initially in a fluid condition, and from which, while in this state, all slag and similar impurities have been eliminated, that we owe the present development of the steel industry.

The superior strength of steel and its more perfect homogeneity have driven iron rails and iron structural material completely from the market. It is, however, curious to note that although this change took place from 12 to 15 years ago, it is only recently that steel has to any great extent superseded wrought iron for forgings, and, as I have already stated, there are at the present day many users of wrought iron forgings who seem to be unwilling to make the change.

The tables below give a series of drop tests made on pairs of bars of wrought iron and steel of the same size to compare their relative strength. These tests are reported by Prof. L. V. Tetmayer, in the records of the Test Bureau at Zurich, Switzerland. All the bars were furnished by the well-known works of Wendell & Co., Hayauge, Loraine. The chemical composition of the two metals was as follows:

	C.	Si.	P.	S.	Mn.
Wrought Iron.....	·05 to ·06	·05 to ·15	·30 to ·50	·02 to ·04	trace
Steel.....	·08 to ·12	trace	·03 to ·06	·02 to ·04	·40 to ·70

The weight of the drop was 661 pounds. The height of fall and number of strokes was as follows:

	1½" square		2⅛" square		2½" square		3⅛" square		4" square	
	W. I.	Steel	W. I.	Steel	W. I.	Steel	W. I.	Steel	W. I.	Steel
Fall	8·66"	8·66"	18·9"	18·9"	28·35"	28·35"	50·4"	50·4"	78·74"	78·74"
Strokes	2	3	2	3	1	4	1	7	1	6

It will be noted that in each instance the steel bar received more severe treatment than the wrought-iron bar, but with far less damaging results. Do these tests show that steel is more brittle than wrought iron?

Let us look into the reasons for the primal reluctance of the trades to adopt steel forgings, and see if they are still cogent and a preference for wrought iron forgings now legitimate. Going back to the time when the large rolling mills of the country changed their product from iron to steel, we find that the industrial conditions of the country were not such as to demand forgings of any considerable size. The forges then in existence were equipped with small hammers, which, by taking advantage of the property of welding possessed by wrought iron, were of sufficient capacity to build up such small forgings of that metal as were demanded. As soon, however, as manufacturers knew that there was a new material in the market that was stronger and more reliable than wrought iron, they appreciated that, by its adoption for forgings, they could reduce the size of many parts of their machinery, and at once made a demand upon the forges for forgings made of it. Had the forges made modifications in their equipment to the same extent that the rolling mills had, in order to meet the requirements of the new material, without doubt satisfactory steel forgings could have been produced. No such changes, however, were made, and such steel forgings as were produced were made under an inadequate understanding of the processes necessary for turning them out.

Steel does not possess to the same degree as wrought iron the property of welding. Instead, therefore, of building up a forging of small pieces, it is necessary to work down the finished piece from a block of steel of considerable size. It should be, in fact, twice its size, in order that the proper amount of work necessary to make it a forging should enter into the metal during its reduction in size by the forging process. For instance, a 12-inch shaft, made of iron, would be built up of small pieces, four or five inches thick, welded together. For a steel shaft of the same size, on the contrary, best practice would require forging down a piece of steel 24 inches in diameter under a hammer whose blow could be felt through 24 inches of metal instead of only four or five inches.

When, therefore, the manufacturers of the country called for steel forgings, in the first place the forges did not have the hammer equipment necessary to make them and there were other ample reasons for their not being able to supply them, as will be appreciated when we view the processes which are now considered necessary for turning out good work. Many forges did not hesitate, however, to supply as good steel forgings as they could make with their incomplete equipment, and having so begun, they have continued ever since to supply work of the same character, which has not been, and cannot be, satisfactory, as I think will be made clear as we go further into the subject. The result is that an undefined prejudice has unjustly been established in the trades against steel and in favor of wrought-iron forgings, and it has been kept fresh in the minds of the uninformed up to the present time to a great extent through these forges themselves, who seem to have been unwilling to equip themselves properly for turning out steel forgings.

By the aid of lantern slides giving views of the forging operations carried on by the Bethlehem Iron Co., and showing the methods which have been approved by the practice of the past few years, Mr. Porter discussed interestingly fatigue of iron and steel and its manifestations. In this paragraph he gave what amounts almost to a definition: "Generally speaking we now know that for any given stress a certain number of repetitions produce failure, the greater the intensity of stress, the smaller the number of repetitions. We know also that the stress required to cause failure is less, and roughly speaking only half as great when the metal is

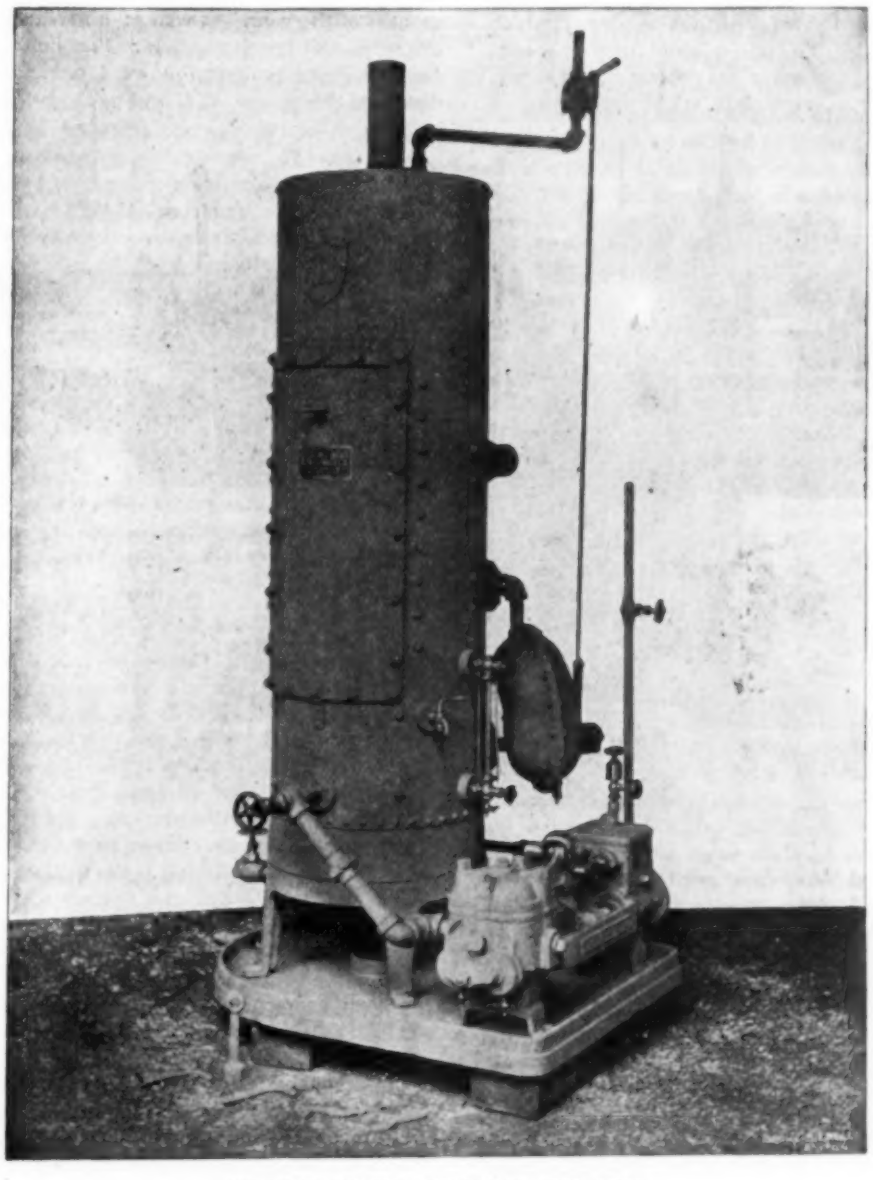
strained alternately in opposite directions, as where it is strained in one direction only."

The causes of failure in forgings, the speaker showed are in general to be found either in their design, quality of material or character of treatment in manufacture. "Almost all forgings are subjected to alternating stresses. If they are composed of a quality of material which has a high elastic limit, properly proportioned, so that the stresses applied fall well below this limit, and if then they are free from flaws, defects and initial stresses, they should resist fatigue indefinitely." The paper, with its discussion, makes a most valuable contribution to the literature of steel metallurgy.

COMBINED HEATER AND BOILER-FEED PUMP.

The value of an efficient feed-water heater and purifier as part of a complete steam producing equipment is now more generally recognized than ever. A late device in this line is the Stilwell heater, filter and purifier, with boiler feed pump attached—all mounted on a neat and substantial cast iron bed plate, as shown in the accompanying cut. The Stilwell open heater uses all the escape steam from the engine, bringing it into contact with thin sheets of falling water at different elevations. Thus all water passing through the heater is thoroughly boiled and the volume of steam used permits of heating and pumping a large quantity of water. The arrangement of corrugated cast iron shelves facilitates the deposit of lime, and the readiness with which they may be drawn out and cleansed is a feature on which stress is laid. The clamps which hold the shelves firmly in position prevent sticking when it is desired to draw the shelves out. The deposits of lime are easily removed by scraping and hammering.

The water, after making the circuit of the shelves, passes behind a water-shed directly to the bottom of the heater, thence up through a perforated plate on which the filtering material rests, and up through the filtering material to the discharge pipe. Particles of mud and sand settle to the concave bottom of the heater, whence they are drawn off or blown out through a waste pipe. The system of upward filtering represented by the Stilwell device is covered by patents, as is any arrangement of filter when used in connection with a series of heating or depositing surfaces. The method of fastening the door in the upright round heater shown in the illustration is worthy of note. The door is held firmly to place by rabbeted bars which are fastened to the shell by studs and nuts and form a continuous joint around the door. The studs pass through oblong holes cut through the bars, so that by loosening the nuts the bars can be moved back far enough to clear the edges of the door. In this arrangement there are no bolts, set-screws or keys to be removed, and the door of the largest heater can be removed in two minutes.



COMBINED HEATER AND BOILER FEED PUMP.

As to the operation of the upright heater and filter, stress is laid upon its thorough separation of the cylinder oil from the exhaust steam and the automatic regulation of feed water under back pressure. It may be used also to receive returns from steam heating systems, thus saving the expense of an extra receiving tank. The inflow of feed water is automatically controlled, and a constant and regular supply of hot pure water is insured, just sufficient to equal the evaporation.

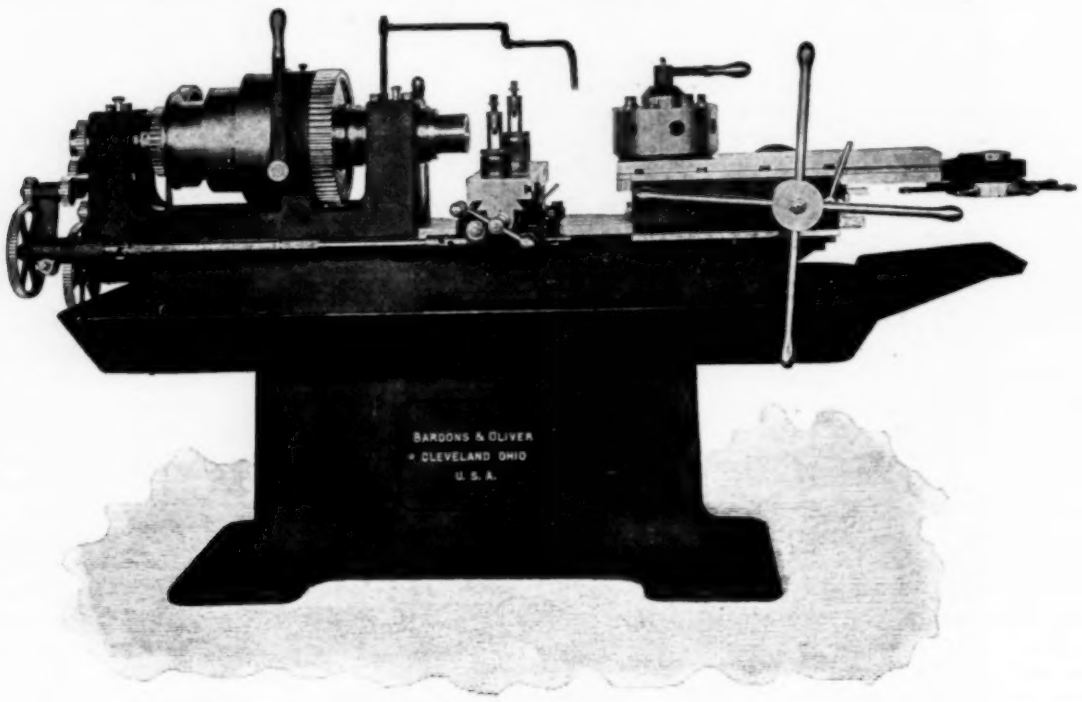
The manufacturers are the Stilwell-Bierce & Smith-Vaile Co., of Dayton, O.

The strike of the puddlers at the Pittsburg Forge & Iron Co.'s plant, Allegheny, Pa., has been settled, the firm granting the advance asked by the men.

NEW SCREW MACHINE.

A screw machine embodying several features of interest has been manufactured recently by Bardons & Oliver, of Cleveland. Attention will be attracted readily by the column construction, and the large oil pan. The former insures entire rigidity of the bed. The oil pan holds the chips and acts as a reservoir for the oil. The pump located at the rear of the head pumps direct from the pan, the suction pipe being provided with a strainer. The head is fastened to the bed by six stud bolts of ample size, which are contained in pockets in the bed. This construction gives free access to the nuts from the outside. Two of the pockets are seen in the cut.

Another feature is the addition of power cross feed to the cut-off rest. For some classes of work, such as forming irregular shapes, the power cross feed is quite indispensable. The cut-off rest is of the usual construction, having a slide mounted on a saddle, which is clamped to the bed. The slide carries tool posts or special forming tool holders, as may be desired. The ball handle shown operates a screw, which gives hand feed to the slide. The power is obtained by means of a worm gear and worm, the worm gear being on the screw. The worm is contained in a worm box, which is pivoted so



NEW SCREW MACHINE.

the worm may be dropped out of mesh with the gear. Power is taken from the rear end of the spindle, through a train of gears, a swinging arm allowing one of the gears to be changed. The universal joints with telescoping sleeve transmits motion to the worm, this construction allowing the cut-off rest to be moved along to any position on the bed. An automatic throw-out is provided with screw adjustment at the front of the slide. The feed can also be thrown out by hand at any portion of its travel.

The star stop at the end of the turret slide consists of a revolving disc carrying adjustable stop screws, one for each tool in the turret, the object being to provide an independent stop for each tool. The disc is connected by means of gearing with the turret, so that as the turret is revolved and different tools brought into action, the corresponding stop screw is brought around into position. This device allows different lengths of tools to be used and saves time in setting up the machine. The feed is arranged so as to be thrown out automatically by the stop screw when the tool reaches the end of its cut. It can also be thrown out by hand by means of the lever shown at the end of the saddle. The setting up of the machine is greatly simplified by this construction, as the tools are clamped in the turrets and all adjustments are effected by means of the stop screws.

One of the distinctive features that appears in this machine is the use of straight lines, exemplifying the American idea of the shortest distance. The machine has a large spindle and bearings, a three and a half inch belt, 17½ inch swing, two and a half inch hole through the spindle, and wire feed can be had if desired. Double friction countershaft is furnished.

THE TIN PLATE MARKET.

There is a better feeling in tin plates, and while the volume of business has been small, there is more disposition on part of buyers to take hold and secure the plates they will require for the summer deliveries. Considerable inquiry and a fair volume of business has developed in the past week. Most of the buying has come from the larger can makers, because the indications are that the vegetable and fruit pack this year will be much larger than for several years past. If this proves to be the case the shortage in plates for July and August delivery, which has been predicted for the last month, will undoubtedly be a fact and a serious fact before the season is over. It is extremely difficult now to obtain plates for spot or nearby deliveries and a premium of fully 10c per box is being paid for May plates over quotations for the later months of the year. Stocks at mills and in dealers' hands are small and are firmly held. For deliveries September to December, we quote as follows, f. o. b. Pittsburg, or Indiana districts:

CHARCOAL TINS.

	IC	IX
Calland Grade, tissue packed,	$4.00	$5.00
Allaway Grade,	3.40	4.30

COKE TINS.

IC, 108 lb.	Basis weight,	$2.85
100 lb.	" "	2.75
95 lb.	" "	2.70
90 lb.	" "	2.65
85 lb.	" "	2.60
80 lb.	" "	2.55

WORCESTER GRADE TERNES.

IC, 216 lb., 20 x 28		$5.80
200 lb.	"	5.50
190 lb.	"	5.40

For deliveries May and June, 10c per box premium over prices above mentioned is being paid; for July and August, 5c to 7½c advance.

FRANK C. ROBERTS & Co., Philadelphia are now engaged upon plans for five blast furnace plants, in which the stacks are to be 100 feet high: Two for the Lorain Steel Co., of Lorain, O.; two for Laughlin & Co., Ltd., of Pittsburg; and one for the Lebanon Furnaces, Lebanon, Pa. John B. Miles, junior partner, is at present at Lorain and will remain there during the construction of the plant. The company is also remodeling for Joseph E. Thropp his blast furnace at Everett, Pa.

CHANGES IN MACHINERY MATERIALS.

To look over any journal devoted to machine construction is to be convinced by the evidence of almost every page that metal workers have entered upon an era of high development in practice, achievement and production. One of these evidences is in the character of the machinery advertised for sale. It is automatic or universal; improved or quick-acting; or made for high-speed special work. Nor is the advancement confined to machine shop tools, for the march of improvement has also invaded the blacksmith shop, where the "bull-dozer," the bender and former, the steam and drop hammer and the special forging machine are, for many purposes, taking the place of the hand hammer and anvil.

It is to be noted too that the materials operated upon have likewise undergone a change. Principal among these changes is the use of steel in the place of iron; and not only this, but steel itself has been studied, developed, and differentiated until now almost every purpose for which it is used has its own particular specification.

It is to be said further that the employment of higher types of machine tools, as also the severer uses to which materials are now put, require more judgment, intelligence and skill on the part of the manipulator than ever in the world's history. This being true, what shall be said of the man who must be developed to keep pace with this advancement? Does he realize that conditions have changed or are changing; that the rule of thumb is passing away; that he must not only become master of the new ways of working but also must learn the characteristics of the new materials he works with; that henceforth he is to be a thinking machine and will be called upon to give reasons and forecast results?

If he does perceive his relations to the new order of things, happy and well will it be with him. He will prepare himself for his ever-increasing responsibilities; will read, study and observe; will converse and compare; will make himself over and bring himself abreast of modern ideas and practice, or else, sad to say, the quick car of progress, as it sweeps along, will leave him trailing grimly on behind unable to maintain a foothold. But all things are possible to the man who earnestly tries and is not discouraged.—[Sparks from the Crescent Anvil.

The Manufacture of Wood Alcohol.

It is necessary first to convert wood into charcoal. The gases and smoke, to the extent of fully 65 per cent of the weight of the wood, may be condensed into pyroligneous acid, from which are obtained wood alcohol, acetate of lime and wood tars. A cord of wood weighing 4,000 pounds produces about 2,650 pounds of pyroligneous acid and 700 pounds of charcoal. The pyroligneous acid from one cord of wood produces nine gallons of 82 per cent crude wood alcohol, 200 pounds of acetate of lime and about 25 gallons of tar, besides 35 bushels of charcoal. After the pyroligneous acid is neutralized with lime the wood alcohol is distilled off, the lime holding the acetic acid in solution. After the separation of the wood spirit the remaining liquid is boiled down in pans to a sugar, which is dried and becomes the acetate of lime in commerce. Acetate of lime is used in making acetic acid.

Fully three-fifths of all the wood alcohol and acetate of lime produced in the world are made in the United States. A considerable quantity is also produced in Sweden. Over 15,000 acres of forest per year are cleared in the United States. Wood alcohol affords a perfect substitute for grain alcohol for manufacturing and mechanical purposes, and at less than one-third the cost. It is used principally as a solvent in the making of shellac varnish and in making celluloid and photographic paper. It makes beautiful dye tints.

Wrought Pipe Manufacturers' Meeting.

The meeting of the wrought pipe manufacturers Wednesday, May 4, at the Monongahela House, Pittsburg, was attended by representatives of the following interests: American Tube & Iron Co., Youngstown, O., and Middletown, Pa.; A. M. Byers & Co., Pittsburg; the National Tube Works Co., McKeesport,; Pennsylvania Tube Works, Pittsburg; Spang, Chalfant & Co., Pittsburg; Riverside Iron Works, Wheeling, W. Va.; Morris Tasker & Co., New Castle, Del.; Oil City Tube Works, Oil City, Pa.; Conshohocken Tube Co., Conshohocken, Pa.; Union Tube & Iron Co., Warren, O.; Oil Well Supply Co., Pittsburg; Cohoes Tube Co., Cohoes, N. Y.; Reading Iron Co., Reading, Pa.; Western Tube Co., Kewanee, Ill. Frank J. Hearne, of the Riverside Iron Works, Wheeling, presided. E. W. Cross, formerly of Spang, Chalfant & Co., Pittsburg, was elected permanent secretary of the association to succeed Joseph Brown. In view of the war situation, the time was considered to be inopportune for any advance in prices and, barring new arrangements with jobbers, the six tens and five per cent agreed upon at the meeting held on April 8, is continued. The base discounts were reaffirmed as follows: Butt weld, black, 57 per cent off; lap weld black, 67 per cent off; butt weld, galvanized, 50 per cent off; lap weld, galvanized, 55 per cent off.

Two Russian War Ships from the Cramp Yards.

Chas. H. Cramp, president of the Cramp & Sons Ship & Engine Building Co., Philadelphia, who has just returned from a two months' stay in Russia, took contracts for building two vessels for the Russian navy. One is a battle ship of approximately 12,500 tons displacement, to have a guaranteed speed of 18 knots per hour throughout a trial trip of 12 hours' duration, at load draught, and carrying 1,000 tons of coal. The other is a protected cruiser, of about 6,100 tons displacement, to develop a speed of 23 knots per hour, under the same trial conditions as those just stated, and carrying 725 tons of coal. This is the first award of a contract for the construction of a battle ship to be built abroad in the history of the Russian navy, and the protected cruiser is also the largest and most important vessel of that type ever ordered by the Russian government in any foreign ship yard.

New Features of the Hazelton Boiler.

The Hazelton Boiler Co., New York, proprietor and manufacturer of the Hazelton or porcupine boiler, has orders from the following concerns: Goodyears' India Rubber Glove Mfg. Co., Naugatuck, Conn., two boilers, (third and fourth orders); the New York Mutual Gas Light Co., New York City, two boilers (eighth and ninth orders); the People's Gas Improvement Co., Trenton, N. J., two boilers; the South Middlesex Street Railway Co., South Framingham, Mass., one boiler (third order); A. H. & C. B. Alling, woolen manufacturer, Derby, Conn., one boiler; the Greenfield Electric Light & Power Co., Greenfield, Mass., one boiler (second order); the Brooklyn Union Gas Co., Brooklyn, N. Y., two boilers (eighth and ninth orders); and three boilers for M. Guggenheim's Sons, for their smelting works at Monterey, Mexico. Nearly all of the above will be equipped with the complete brick-lined steel jacket, with square-furnace and square-grate surface, lately introduced by the Hazelton Boiler Co. This steel jacket with square furnace makes a unique and excellent setting; and the firing front is embellished by an entablature or cornice, with fluted cast iron pilasters, making the general effect very attractive. A battery of these boilers, placed side by side, presents one continuous firing front the entire length of the battery, and is a most convenient arrangement for firing and cleaning. An unusually large aggregate horse power of this type of boiler can be placed on a given ground area. The Hazelton Boiler Co. carries a considerable stock of large boilers in units of 200, 250, and 300 h. p., to which there is constantly added, as the three sizes named are most popular with the company's customers. The Hazelton boiler, after a test of nearly 18 years, has made an enviable record and commands high approval from its many users.

THE annual meeting of the Western Foundrymen's Association will be held on Wednesday, May 18, at the Great Northern Hotel, Chicago. At this meeting the annual election of officers will be held. It is especially desired that members send their ballots by mail, in order to insure a full vote and to lessen the work of the tellers. A lunch will be served by the association, and the order of the evening is a general talk by the members on foundry matters and the good of the association.

THE recent Government order for 45,000 tubes for cruiser boilers included a quantity of seamless tubing from the Shelby Steel Tube Co., Shelby, O.

HOW TO SECURE UNIFORMITY IN PIG IRON ANALYSES.

We print below the remainder of the letters received from chemists and others relative to the proposition made in Mr. West's paper before the Pittsburg Foundrymen's Association, for a central laboratory to furnish standardized drillings of cast iron:

J. M. CAMP, DUQUESNE, PA.

I wish to enter my protest to Mr. West's deductions from the results of the analyses of three samples of iron distributed by him. That the drillings contained sand is beyond question, and I believe I was the first to notify him on this point. That the drillings are also very irregular has also been proven here, aside from the results he reported. On separating the coarse from the fine, very widely divergent results were obtained on phosphorus, particularly on the two samples of foundry and charcoal irons.

I agree perfectly with Mr. Colby's criticism of Mr. West's paper as published in the *Iron Age* of April 21. I can also add that the best argument for the scientific control of the foundry is the every-day practice of a modern blast furnace and steel works plant, where from the analyses of all the raw material entering the furnace, theoretical mixtures are made up that agree within a few thousandths of one per cent of the actual resulting iron of the controllable elements. From the iron, still fluid, steel is made, and so thoroughly is the concentration, increase or loss of each element known, that the resultant steel is as sure as fate and taxes. Standard drillings are of inestimable value at times, but their preparation is as important as the analysis. They should be of about one size, for instance such as would go through a 10-mesh sieve and stay on a 20, free from dust and all foreign matter

PROF. C. H. BENJAMIN, CLEVELAND.

I approve heartily of Mr. West's project of a central laboratory for furnishing standardized drillings and deem it the cheapest and best way of securing uniformity. I have consulted with Prof. A. W. Smith, who has charge of the metallurgical work here and we are agreed that if it is desired such work can be done at Case School in such a way as to make the standards authoritative and above suspicion, and at as low a cost as anywhere.

W. L. WATT, KITTANNING, PA.

Referring to the suggestion of establishing a "central standardizing laboratory" in this the Pittsburg district, in my opinion it is a splendid idea, and bound to be productive of good results. Please count on me if I can be of any service, or assist in any way.

GUY R. JOHNSON, EMBREVILLE, TENN.

I feel sure that Mr. West's project for central laboratory can be made a financial success, for the simple reason that every laboratory in the country has to have standardized drillings, and I can say, from bitter experience that such drillings are a very expensive necessity.

ROGERS, BROWN & CO., CINCINNATI.

We notice in *The Iron Trade Review* of April 14, a paper by Mr. Thos D. West in regard to analyses of pig iron, and we understand that this paper is to be discussed at a future meeting of your association. Kindly pardon us if we seem to intrude, but we consider the matter of great importance to iron producers, users and the selling agents also. We have found a decided variation in the results obtained by different chemists who were said to be competent; and in some cases they have attributed the difference to the fact that they did not use similar methods in their work. We do not suppose that identical results will be obtained, but it seems that it would be very much more satisfactory if the chemists themselves would determine which methods are most likely to produce accurate results, and then have these methods adopted by all of those who make a specialty of iron, steel, coke, ore, etc.

We expect considerable variations when different samples are taken, even if they come from the same carload of material; but there should not be the wide differences that exist in determinations of the same sample by chemists of high standing. If the Pittsburg Foundrymen's Association can assist in the good work that has been started by Mr. West, they will deserve the thanks of the entire iron trade.

JOHN P. GRIFFITH, MANCELONA, MICH.

I was very much interested in the article, "Need of Greater Uniformity in Pig Iron Analyses," written by Mr. Thos. D. West, for *The Iron Trade Review*, of April 14, and I heartily endorse his views. In my 12 years' experience, I have more than once found the need of a reliable standard, and almost persuaded Bullock & Crenshaw, Arch st., Philadelphia, Pa., about six years ago, to supply their customers with various standards. The scheme fell through, but not through any fault of mine. As you are probably aware, we cater to the malleable iron trade, and practically guarantee our iron, an analysis accompanying each car. We have had several "scraps" on sulphur and on calling in a third party, they have always substantiated the results obtained at the furnace. I merely mention this, as it proves the correctness of Mr. West's views, viz., that a great deal depends on the method used. I hope the sentiment of the profession may be favorable to a "central standardizing laboratory."

S. B. MARSHALL, DUNBAR, PA.

I read with much interest Mr. Thos. D. West's article in reference to the establishment of a "central standardizing laboratory." He asked that the chemists, etc., respond with their ideas. I certainly think it would be a good plan if these samples were to be standardized by the mean result of a great number of chemists who had analyzed portions of them. In that way these great differences in the analyses would in a measure be stopped. I take a great interest in anything connected with the foundry and iron trade, as we are producers of special brands of foundry iron, also forge and basic.

THE THOMAS IRON CO., HOKENDAUQUA, PA.

We are thoroughly convinced of the benefits to be obtained from having access to absolutely correct standards. We consider that the work that already has been done and that which is still to be done by the Committee on International Standards will result to the great benefit of all. So much depends on the uniformity of the samples on which checks are to be run that we think too much care cannot be given to the matter of sampling. Our samples of the drillings sent out by Mr. West contained sand and we were advised by Mr. West of this fact and requested to remove the sand. The samples sent out were not carefully prepared, uniform samples.

DR. WM. B. PHILLIPS, BIRMINGHAM, ALA.

What is needed particularly is unifom methods in the analysis of iron and steel. Standard samples are, of course, excellent things in their way, but they do not cover the ground as I see it. Rigid analytical methods to be adopted and used by all who are engaged in the foundry trade, whether as producers of iron or manufacturers of castings, are the really essential demands of the situation. I have had occasion of late to look very carefully into the question of methods as applied to the sale and use of bauxite from Georgia and Alabama for alum making. For the last several years there has been more or less friction between the miners and the manufacturers as to the content of alumina, and the differences have been due almost entirely to the differences in the analytical methods employed for the estimation of the alumina which is of value in alum making. Until the miners and the manufacturers can agree upon a common method there will always be trouble. The alum business is, of course, a small thing as compared with the foundry trade, but the principle governing identity of analytical results is the same. For the last 20 years the official agricultural chemists have been fighting the battle of uniform methods until at last, through the Association of Official Chemists, the methods adopted are made obligatory. All of the fertilizers and fertilizing materials sold in the United States are subject to inspection and analysis by the chemists of the various States, and all the chemists use the same methods. The results are not always satisfactory, for after all there remains the personal equation to be reckoned with, but they are far more satisfactory than

they were 20 years ago or even 10 years ago. There is no such thing as perfect satisfaction, and can not be so long as we have to deal with imperfect human nature.

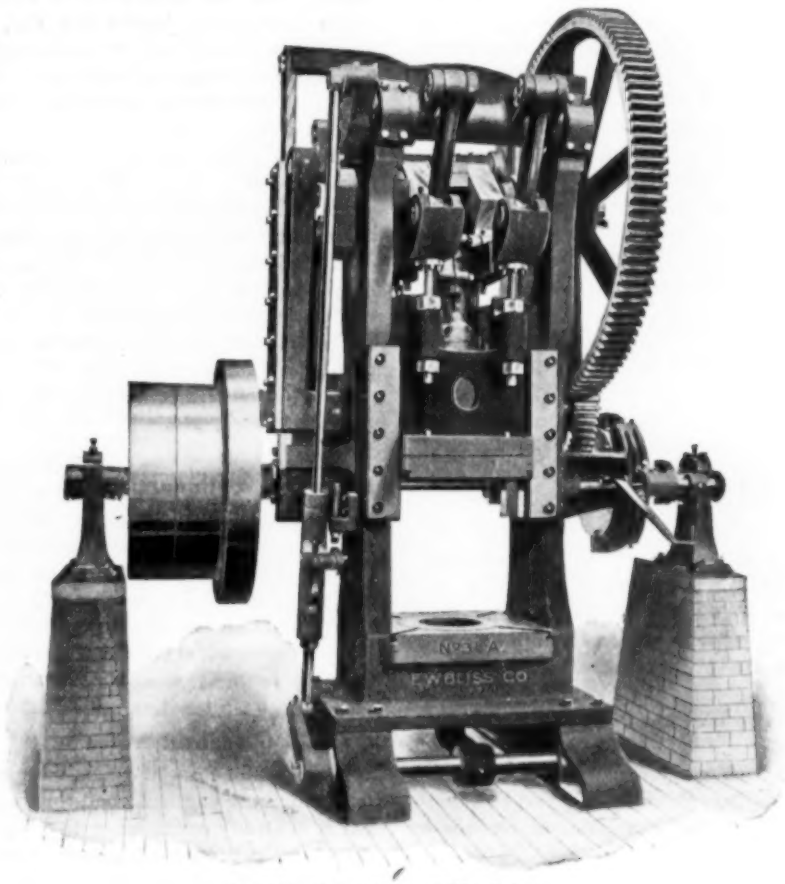
But the first step towards greater satisfaction in the iron trade, as it was in the fertilizer trade, is to adopt uniform methods of analysis, preceded by uniform methods of sampling. I regard the sampling of material as the most important thing in connection with the whole subject. As a rule, the chemists may be relied upon to make accurate returns of the composition of samples sumbmitted to them, and discrepancies in results are due, for the most part, to discrepancies in the samples. Chemists seldom have anything to do with the sampling of material sent to them for analysis, and yet when discordant results are obtained from what some one or other says are identical samples the chemist is blamed. The so-called practical men assume that the only persons around the plant who make mistakes are the chemists and that they themselves are infallible. The fact is, that the taking of samples, which is ordinarily regarded as of minor importance, is really of the greatest importance and outweighs the mere performance of the analysis. The analysis may and doubtless does represent the sample but what does the sample represent? No trustworthy deductions can be made from the analysis, no matter who makes it, until it is known that it correctly represents the material under discussion.

In my opinion the first thing for the foundrymen's association to do is to agree upon a uniform method of sampling pig iron and castings, and then to agree upon a uniform method of analysis. If this association proposes to enter upon the subject of chemical control of the iron and the producs it can do so only in this way, for it is useless to analyze samples that represent nothing. The establishment of a central laboratory is an excellent idea and should be carried out; but if it be not preceded by rigid requirements as to sampling, the results from it will not command the attention and the confidence we naturally desire. If the association is to go into this thing it should do so properly or not at all, and should realize fully the logical consequences of the step it is about to take. No half-hearted measures will be of much value either to the producer of foundry iron or the consumer.

In this part of the country the producers are averse to the sale of ordinary grades of iron on analysis, and this too in spite of the fact that the granulations, fracture, color, etc., of the iron are no longer a reliable indication of its composition. They realize this and yet are almost a unit against the sale of the iron on the only basis that can maintain. These irons cannot be correctly graded in the yard. Every one sees this and yet no one is willing to offer the iron to the trade on its merits. The consumers of this iron have the remedy entirely in their own hands, for the foundation of the foundry trade is in the cast-house. If foundrymen should insist upon the purchase of iron on analysis one of the greatest steps towards uniformity in the trade would be taken.

SPECIAL TOGGLE DRAWING PRESS.

The machine shown below is a special toggle drawing press built by the E. W. Bliss Co., Brooklyn, N. Y., for drawing deep articles, and is adapted to the manufacture of silver, britannia, brass and copper goods, and also of aluminum utensils. It is an advantageous press for general work in an enameled ironware factory. The frame and shaft are much heavier than are usually made. The outboard bearings are also a feature, as is the automatic knockout, which differs from the ordinary type. The press is heavily double back geared, runs continuously and is controlled by the hand-actuated friction clutch shown at the right of the press. This clutch does away with the heavy shock which, in positive clutches, tends to destroy the clutch parts.



SPECIAL TOGGLE DRAWING PRESS.

This press will draw a blank 3-32 inches thick, 25 inches in diameter, up to eight inches deep. Some of the principal dimensions of the machine are: Opening in bed, 17¾ inches round; width between uprights, 30 inches; stroke of blank holder, 12 inches; stroke of drawing punch, 20 inches; adjustment of drawing punch, 6 inches; will receive drawing punch 25 inches in diameter; weight of balance wheel, 1,200 lbs.; diameter of large gear 72 inches; proportion of gearing 22 to 1; floor space over all, 83 x 141 inches; extreme height to top of gear 127½ inches; total weight, about 30,000 lbs.

The Lozier Mfg. Co., of Toledo, O., manufacturers of Cleveland bicycles, has agreed with the American Federation of Labor to employ no girls in its factories after this season, which it is stated will end July 1. The agreement affects factories in Toledo, Toronto, Can., Westfield, Mass., and Thompsonville, Conn. Last year girls were employed by this company, displacing men in operating tools making bicycle parts.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants :—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

A correspondent of our Chicago office is in the market for a machine to grind rosin to a powder, for use in making cores. Makers of such machines are invited to send catalogues, etc., to *The Iron Trade Review*, 1522 Monadnock Block, Chicago.

At Dubuque, Ia., the Novelty Iron Works have been incorporated to manufacture machinery, engines, etc., and carry on a general foundry business. The capital stock is $15,000. The incorporators are George E. Davis, E. H. Headford, G. A. Schenkowitz, B. F. Richardson, and John Hemler.

The Michigan Iron & Steel Co., the new company organized to operate the rolling mill at Muskegon, Mich., will begin operations in two weeks, employing 300 men. E. P. Caldwell is president and Leslie Durley, secretary.

The Quincy Novelty & Foundry Co., at Quincy, Ill., capital stock $5,000 has been incorporated by W. E. Williamson, S. C. Pitney and L. E. Emmons, Jr.

The Wheel Trueing Brake Shoe Co., of Detroit, has been organized as follows: President, Judson M. Griffin; vice-president, Geo. A. Winslow; secretary, George Bradbeer; treasurer, not yet named. The articles of association show a capitalization of $60,000 all paid in The object of the new company is the manufacture of a patent brake shoe, which is used for the purpose of trueing up flat wheels.

At Duluth, the Iron Bay Works have been leased to the Interstate Malleable Iron & Machine Works, which will manufacture the Chilton car coupler and Chilton steam and traction engines.

The Puckett Plow Mfg. Co., of Belleville, Ill., with J. E. Puckett president and general manager, is in operation at the Standard Foundry building. A plant costing $10,000 has been put in the building.

The Globe Foundry Co., Miamisburg, O., has been incorporated with $10,000 capital.

New Construction:—

The Excelsior Stove Co., Quincy, Ill., will build a new brick foundry, 45x124 feet, six stories in height, to cost $14,000.

The Whitin Machine Co., of Whitinsville, Mass., has just completed a new casting shop which will be entirely fireproof. It is furnished by the Berlin Iron Bridge Co., of East Berlin, Conn.

At La Crosse, Wis., the La Crosse Plow Works will erect new modern buildings.

Plans are being prepared at Youngstown, O., under direction of M. A. Neeland, consulting engineer, for the two 500-ton blast furnaces the Ohio Steel Co. has planned for some time to erect.

It is reported that the Philadelphia & Reading Co. will build a new machine shop at Tamaqua, Pa.

The Troy Laundry Machinery Co. has purchased a tract of vacant land at South Chicago, near Houston ave. and 95th st., and will construct a large plant at that place for the manufacture of laundry machinery. The company is one of the largest concerns in the country engaged in the manufacture of this kind of machinery. It has been located in Chicago for a long time and its business has expanded on an unusually rapid scale.

At Arthur, Ill., a new building 35x102 feet is being erected by the Monroe Road Machine Works.

Machine shops for the electrical engineering and other mechanical departments of the State University are to be erected at once. They will be 222x50 feet and two stories.

The B. & O. Railroad will build a foundry at Garrett, Ind., in the near future.

The new buildings to be constructed by the Western Maryland Road at Hagerstown, Md., consist of a one brick story roundhouse, a machine shop, and blacksmith shops, all under one roof. The cost will be $30,000. The shops will be extended from time to time, the capital being raised by Hagerstown people.

At Philadelphia, John Wilbraham, trustee, has taken a permit to build a one story brick foundry and machine shop, 100x45 feet, and annex 22x51 feet, at Amber and Cumberland sts.

Work is to begin at once at Key West on new machine shops for Government work, under Chief Engineer Little.

The plant of the Wrought Iron Specialty Works, at Rogersford, Philadelphia, recently burned, is being rebuilt.

Additions, Enlargements, Removals, Etc.:—

The Albion (Mich.) Malleable Iron Co. will erect additional buildings.

L. Willey, of Mt. Upton, N. Y., has purchased the equipment of the Jewells & Brooks foundry at Norwich, N. Y., and will soon start a foundry at Mt. Upton.

The W. F. & John Barnes Co., Rockford, Ill., has plans completed and work will soon start on a large addition to its factory, to be 100x100 feet, four stories, high built of solid brick.

The Monongahela Iron & Steel Co., of Pittsburg, Pa., with works at Hay's Station, Pa., manufacturer of fine grades of muck bar, is making some extensive additions to its plant. Among these is a 10-inch mill of modern type.

The Kilbourne & Jacobs Mfg. Co., Columbus, O., has begun work on two additional brick structures 45x100 feet, in which will be installed special machinery adapted to the manufacture of wheelbarrows, scrapers (wheel and drag) and steel shapes.

Plans are on foot for the enlargement of the Laramie (Wyo.) Rolling Mills. New equipment will be installed.

The Wheeling Steel & Iron Co.'s mill at Benwood, W. Va., is running full time and is busier than at any time in five years.

A. T. Green, Aberdeen, S. D., has been making additions to his machine shops. A foundry for the manufacture of general castings is also planned.

The Albion (Mich.) Malleable Iron Co. will enlarge its plant.

An addition will be built to the foundry of S. B. Sexton & Son, Baltimore, Md.

Fires and Accidents:—

Part of the Pasaic Rolling Mills, at Paterson, N. J., was blown up May 4. One man was killed and three injured. The explosion occurred in the boiler and gas producing plant. The damage was $75,000.

At Lake Charles, La., the Watkins Car Shops, containing improved machinery for car building and repairing, burned May 2. Loss, $75,000; no insurance.

General Industrial Notes:—

The plant of Russell & Co., manufacturer of threshers, farm and automatic engines, road rollers, and saw mills, Massillon, O., is in steady operation with a full force of men. The demand for its products is greater than ever known, even before the panic. Prosperity among the farmers has caused the boom.

Shetter & Flanagan, of New Cumberland, W. Va., have purchased the Means foundry and machine shop at Steubenville, O., for $18,000. The firm of James Means & Co. has been in existence since 1820.

At Youngstown, O., Frank D. Runner, of Sharon, Pa., has purchased the plant of the Poultney Machine & Foundry Co., and will put it in operation at once.

Sharpsville Furnace, at Sharpsville, Pa., having worked up its old ores, was banked May 4, and will remain out for at least 30 days.

The Sargent Co., Old Colony Bldg., Chicago, manufacturer of steel castings and brake shoes, has lately made extensive improvements to its plant at 59th and Wallace sts. It has been necessary for the company to do this in order to accommodate its largely increased trade, in its specialties. Among the equipment recently added are a 20 ton Shaw electric crane, a 100 h. p. Russell engine, a 40 k. w. generator from the Western Electric Co., Chicago, and a large size metal saw furnished by the Q. & C. Co., Chicago. The Sargent Co. has also built a new storage building for patterns, 30x100 feet in size.

The American Tool Works Co., of Cincinnati, reports that the demand for machine tools for foreign countries is still ac-

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The Cochrane Heaters and Purifiers and the Cochrane Live and Exhaust Steam Separators are noted in America and other countries for their practical, common sense design, substantial construction, reliability of action and general suitability for the purposes used. They have been approved and adopted by many very well-known consulting, advisory and acting engineers, and by hundreds of the big steam users. We take pleasure in answering inquiries, and to those interested, who will send particulars, we will also be pleased to forward printed matter, specifications, estimates, etc.

HARRISON SAFETY BOILER WORKS, Columbia Station, PHILADELPHIA, PA.

tive notwithstanding hostilities between this country and Spain. The company in the past week has received a number of orders through its office at London, Eng., among them being one from J. Stone & Co., of Deptford, Eng., for a line of brass working machinery, including monitor lathes, valve millers and cock grinders. An order has come, also, from Furnival & Co., of Reddish, Eng., for a number of standard engine lathes, drill presses and shapers.

The Lorain Steel Co., of Lorain, O., successor to the Johnson Co., has contracted for 10,500 h. p. water tube boilers of the Cahall make for the new blast furnace plant and blooming mill. Twenty-five hundred h. p. of these boilers will be equipped with the Cahall chain grate stoker.

The Link Belt Machinery Co., Chicago, has recently established a branch office at 521 17th st., Denver, Col. Mr. A. E. Lindrooth, engineer in charge, will look after the company's interests in Colorado and adjacent States and Territories.

The Rice Machinery Co., 166-174 South Clinton st, Chicago, has secured a contract for the power transmission machinery required for a large beet sugar plant being erected in California by C. H. Dyer & Co., of Cleveland.

Laughlin & Co., Ltd., Pittsburg, have ordered from E. P. Allis & Co., of Milwaukee, for their Eliza furnaces, a vertical, steeple type compound blowing engine, with two air cylinders 84 inches in diameter; one 42-inch diameter high pressure and another 80-inch diameter low pressure steam cylinder. The flywheel will be 24 feet in diameter and will weigh 100,000 pounds. It will rotate on a shaft 23 inches in diameter. The engine will be capable of delivering 40,000 cubic feet of free air per minute at a pressure of 25 pounds.

The Riter-Conley Co., and the James Rees & Sons' Co., of Pittsburg, have been requested by the Government to bid on five big transport steamboats. The boats are to be of steel, 172 feet long, 36 feet beam and six feet deep, to be finished complete with cabins, all machinery, and large electric lighting plant.

The Rice Machinery Co., 166-174 South Clinton st., Chicago, has lately furnished through its St. Paul agents, the Robinson & Cary Co, machinery for the Great Northern R. R. Co.'s machine shops at West Superior, Wis., and the Northern Lumber Co., Cloquet, Minn.

The Albany Mfg. Co., Albany, Ind, it is reported, will erect a mill to make a specialty of steel tubing.

Furnace No. 2 of the Dunbar Furnace Co., at Dunbar, Pa., has gone out of blast.

The Fruitport (Mich.) Furnace of the Spring Lake Iron Co. handled 450 car loads of material in April, shipping 6,000 tons of iron to Kentucky, Missouri and the Northwest.

The working force of the Wagner Palace Car Co., at East Buffalo, N. Y., has been reduced 50 per cent, 680 men being discharged.

At Manchester, N. H., the C. S. Forsaith Machine Co., machinery manufacturer, was placed in the hands of a receiver. The company was incorporated in 1884, and its capital stock is $275,000. The business will be continued.

The Enterprise Foundry Co., Belleville, Ill, has contracted for a new 20-ton cupola.

Lochiel Furnace, at Harrisburg, Pa., idle for several years, is being put in shape to resume and will make spiegel for the Pennsylvania Steel Co.

Furnace No. 2 of the Dunbar Furnace Co., Dunbar, Pa., was banked May 3. It had been running steadily for 16 months.

The Cambria Iron Co.'s output at present is the largest in its history. Assistant General Manager Weaver is quoted as saying that 1,000 more men are now at work than in 1892, the present force being 7,500.

The Morgan Engineering Co., Alliance, O., has given its employes an advance in wages of 15 per cent, taking effect May 1. The shops are crowded with Government work and are operated night and day, including Sunday.

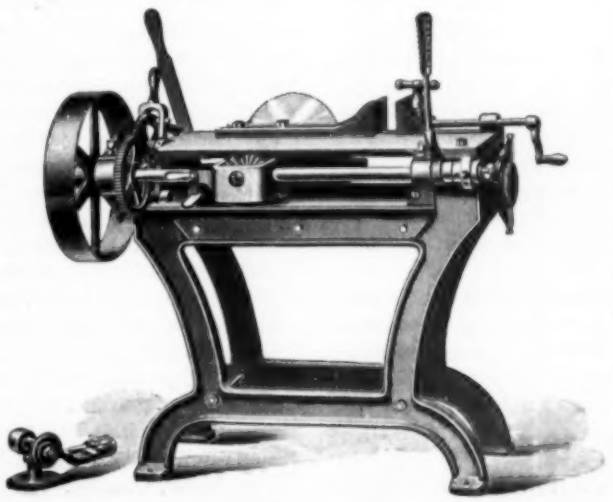
The New Castle Engineering Works, New Castle, Pa., have a contract for an additional hot blast stove, 20 feet 6

The Q & C

Shop Saws

Cut Everything. - - - -

No. 1. Capacity, 4 inches.
No. 2. " 5 "
No. 4. " 8 "
No. 8. " 3x12 "



POWER SAWING MACHINES

For all purposes.

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Chicago. New York.

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UNION MINING CO.,

Proprietors of the CELEBRATED Mount Savage Fire Brick

GOVERNMENT STANDARD.

Established 1841. Capacity, 60,000 Per Day; 18,000,000 Per Year.

The First Manufactory of its Kind in the U. S.

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"OTIS" FIRE-BOX PLATES A SPECIALTY.

Flange Plates, Ship Plates, Tank Plates, Steel Car Axles and Forgings of all kinds.

Steel Castings from 100 to 75,000 lbs.

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RICE MACHINERY CO., 166-174 South Clinton St., Chicago.

Engineers, Founders and Machinists.

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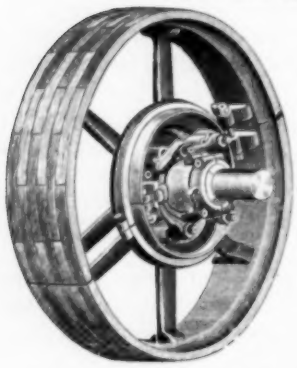

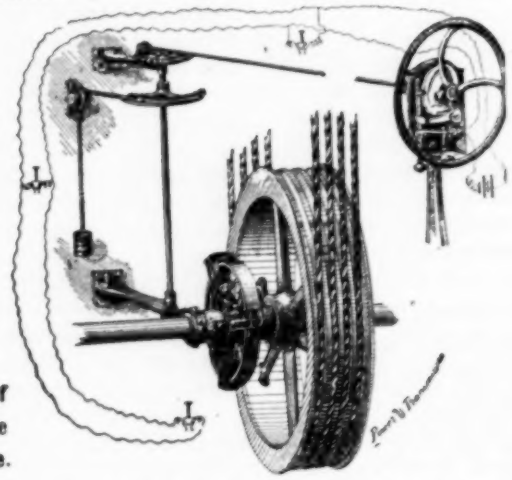

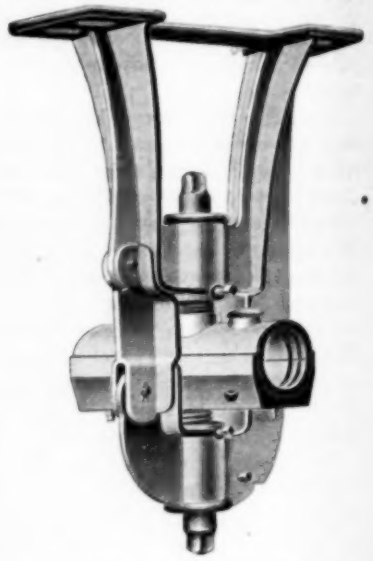

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Shafting, Hangers, Friction Clutches. Elevator, Brewery, Sugar Refinery and Oil Mill Machinery, Belting and Mill Supplies.

GENERAL AGENTS FOR THE DODGE INDEPENDENCE WOOD SPLIT PULLEYS.

inches by 75 feet, for the Norway blast furnace, at New Castle, recently purchased by the Shenango Valley Steel Co.; also new furnace shell for the Pulaski Iron Co., Pulaski, Va.; a new hearth jacket for blast furnace of Tonawanda Iron & Steel Co., Tonawanda, N. Y.; eight 42-inch Forter valves for New England Coke & Gas Co., Boston, Mass.; and three Forter valves for Otis Steel Co., Ltd., Cleveland.

The Moline Pattern Works, Moline, Ill., changed its name April 1 to Clark Mfg. Co.

Henry E. Pridmore, 111 and 113 West Harrison st., Chicago, manufacturer of molding machines, is arranging to increase his facilities considerably. The demand for these machines steadily increases. The war has not interfered with this business, the past week having brought exceedingly satisfactory orders, some of them from foundries located directly on the seaboard.

The Colorado Fuel & Iron Co., Pueblo, Col., has relined one of its blast furnaces with Scott copper bosh cooling plates, multiple tuyeres. In building this furnace plates were placed with seven and a half inch brick between the plates, calculating that the cooling effect of the copper would hold the lines of the furnace, overcoming all corrugations. In this lining 120 Scott plates were used and 64 large Gayley plates. The Edith furnace, at Allegheny, Pa., is relining with 170 Scott copper bosh cooling plates, 24 inches deep, also 16 tuyeres. The new furnace at Buffalo, N. Y., building by the Union Iron Works, F. B. Baird, manager, will be supplied with Scott bosh plates and copper tuyere coolers and tuyeres. In the new lining of Hazelton Furnace, Andrews Bros. Co., Youngstown, O., 75 Scott bosh plates will be used to preserve the bosh and hold a line, to provide for lowest possible combustion. These details cover some of the latest cooling equipment made by Smeeth's Copper & Bronze Co., Randolph and Desplaines sts., Chicago.

U. BAIRD MACHINERY CO.,

123-125 Water St., **PITTSBURG, PA.,** 124-126 First Ave.

Machine Tools and Supplies. Send for list of Second-hand Tools.

McDOWELL
SEMI-STEEL
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(Cupola metal.) Government tests 36 000 to 49,000 tens. strength.

HANSON McDOWELL,
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A firm needing a certain line of goods naturally turns first to those it has seen oftenest advertised, and with whose name it thus has become familiar. "Keeping everlastingly at it brings success."

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GENERAL DRAUGHTING AND DESIGNING.

Address
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Improved **Machine Tools**

FOR USE IN

Bridge and Structural Iron Works. Boiler and Tank Shops

Are illustrated in our NEW CATALOGUE "O." Send for it."

Double Angle Shear, motor driven.

HILLES & JONES COMPANY,
908 Church Street,
WILMINGTON; DELAWARE.

N. B.—Send for list of Machine Tools on hand for quick delivery.

"Metallurgy of Cast Iron," Price $3.

PUNCHES AND SHEARS

OF ALL KINDS

MANUFACTURED BY

The Long & Allstatter Co.,

HAMILTON, OHIO.

Send for catalogue.

The Crane Iron Co., Catasauqua, Pa., has elected as directors Leonard Peckitt, of Catasauqua; Robert F. Kennedy, Frank G. Kennedy, W. S. Pilling, R. E. Hastings, George M. Troutman, of Philadelphia. Mr. Peckitt was re-elected president and superintendent, and J. M. Hodge, secretary and treasurer.

The Delaware Iron Works, New Castle, Del., are about to resume.

The Carlisle Mfg. Co.'s plant at Carlisle, Pa., has been sold to the Adams Railway Equipment Co., Philadelphia. Steel railway ties are the principal article of manufacture.

D. C. Prescott, who has conducted the Marinette Iron Works, at Duluth, for the past eight years, paying out in that time over $1,000,000 in wages, has removed to Chicago to engage in other business.

The Floodwood, O., furnaces of the New York & Western Coal Co. are being dismantled and parts of the equipment removed to Buffalo, for the new Union Iron works furnace, of which F. B. Baird is the promoter.

The deed covering the transfer of the West Superior works to the Wisconsin Steel Co. has been filed. The new company has an authorized capital of $5,000,000. Its officers are: F. T. Gates, of Chicago, president; H. W. De Forest, New York, vice-president; E. V. Cary, secretary and treasurer; and G. W. Murray, general counsel. John D. Rockefeller, Jr., is in the directory. The steel works will be started within a year. The culvert iron department is running steadily.

Furnace A, at Sparrow's Point, Md., is ready to blow in.

The Homestead, Pa., council has vacated certain streets for the Carnegie Steel Co.'s new plant, the company agreeing to reimburse the borough for its improvements and indemnify it against damage.

The United States Court at Cincinnati gave the McCormick Harvester Co. judgment in two cases charging infringement of patent—one against the Aultman Co., and another against Aultman, Miller & Co., of Canton and Akron, O.

Mary Pratt Furnace, at Birmingham, Ala., was sold May 2 at public sale to T. J. Cornwall, representing bondholders, for $35,000. It may start up again.

The new tin mill of the Laughlin Co., at Martin's Ferry, O., is ready to start.

The Sulzer Machine Co., Louisville, Ky., assigned last week, to F. W. Sulzer.

There has been talk recently of a proposed increase in the capital stock of the Westinghouse Air Brake Co. The present capitalization is $5,000,000, the shares being $50 each. On this dividends amounting to about 40 per cent a year are paid. Tne plan of the company, as it is stated unofficially, is to double the capital stock and give to each shareholder an additional share for each one held. This is in reality the payment of a 100 per cent extra dividend, and is said to be warranted by the financial condition of the company.

The Bethlehem Iron Co. recently voted to close its works to visitors and to employ armed coal and iron police It was decided that all employes who enlist shall on their return be given positions not lower in rank or pay than those they give up. A semi-annual dividend of four per cent was declared.

In the new machine shop of the American Steel Casting Co., at Sharon, Pa., will be placed six shapers, five planers, one slotter and three lathes.

Furnace No. 1 of the Andrews & Hitchcock Iron Co., Hubbard, O., is again in blast.

$1.50 to Columbus and Return, Sunday, May 15th.

Via C. A. & C. R'y. Mt. Vernon-Panhandle Route, to see the Ohio National Guards at Camp Bushnell. Special train leaves Cleveland Union Depot 7 A. M., returning leaves

INLAND IRON & FORGE CO.,

Marquette Building, CHICAGO, Manufacturers of

BAR IRON AND STEEL,

Angles, Channels and Special Shapes for Car, Carriage and Wagon Work.

Iron and Steel Car Axles and Forgings.

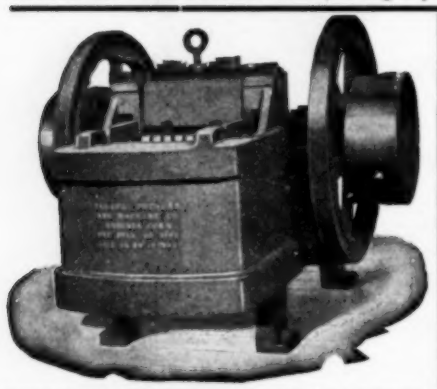
Works, EAST CHICAGO, IND.

(Formerly owned by East Chicago Iron & Steel Co.)

Conestoga Building, EDWARD E. ERIKSON, PITTSBURG, PA.

Regenerative Gas Furnaces and Water Seal Gas Producers.

Producer Gas under Tubular Boilers, saving 20 per cent in fuel. NO SMOKE.



THE FARREL (Blake Pattern,) (Ore and Rock.)

CRUSHER.

STANDARD OF THE WORLD.

Farrel Foundry and Machine Co.,

EARLE C. BACON, Engineer,

Havemeyer Bldg., NEW YORK.

If you are thinking of enlarging your mill, foundry or machine shop, or of purchasing machinery of any kind, send us a line giving character of machinery needed. We can put you in communication with manufacturers from whom you can buy advantageously.

The Brown GAS AND GASOLINE Engine.

Uses Gas or Gasoline. Makes no compression while engine is running idle. Charges fired with electric spark tube igniter. Made upon honor and fully guaranteed. Write for description and prices.

Columbus Machine Co.,

COLUMBUS, O.

Columbus, 7 P. M. Parlor car, wheels free. Base-ball, Columbus vs. Indianapolis. Through fast train, no local stops. Get tickets of Penna. Agents. C. F. DALY, General Passenger Agent.

REDUCED FARES.

To Various Points via Pennsylvania Lines.

Excursion tickets will be sold via Pennsylvania Lines as indicated in the following paragraphs. Although concessions in fare are authorized for meetings of certain Orders, tickets may be obtained by any person whether a member of the Order or interested in the event. The reduced rates will be open to everybody.

To New Orleans, La.—May 6th, 7th and 8th, account meeting B. P. O. Elks. Return limit fifteen days.

To Warsaw, Ind., (Winona Lake).—May 16th, 17th, 18th, 19th, 20th and 21st, good returning until June 3d, account Presbyterian General Assembly.

To Dayton, O.—May 23d and 24th, from points in Ohio only, account Knights of Pythias Grand Lodge of Ohio; good to return until May 25th.

To Columbus, O.—May 24th and 25th, account State Conventions of People's Party, Liberal Party and Silver Republicans, from Ohio points only. Return limit May 26th.

To Dallas, Texas—June 11th and 12th, account meeting of Nobles of Mystic Shrine. Return limit, June 28th.

To Columbus, O.—June 13th and 14th, good returning until June 17th, for State Sunday School Convention. From points in Ohio only.

To Mt. Vernon, Ohio—June 13th and 14th good to return until June 17th for State G. A. R. Encampment. Excursion rates in effect from points in Ohio only.

To Louisville, Ky.—June 19th and 20th, for Jr. O. U. A. M. National Council Meeting. Return limit June 20th.

To Mansfield, Ohio—June 27th and 28th, for State Christian Endeavor Convention. From points in Ohio only; good returning until July 1st.

To Washington, D. C.—July 3d, 4th, 5th and 6th, for the National Educational Association Meeting. Good to return July 15th, with privilege to extend return limit until August 31st.

To Indianapolis, Ind.—August 8th and 9th, for L. A. W Natjonal Meet. Return limit, August 15th.

To Richmond, Ind.—August 19th and 20th, good returning until August 28th, account Society of Friends Conference.

To Indianapolis, Ind.—August 20th, 21st and 22nd for Knights of Pythias Grand Encampment and Supreme Lodge Session. Return limit August 30th, with privilege to extend until September 10th.

To Cincinnati, Ohio—September 3d, 4th, 5th and 6th, for the G. A. R. National Encampment. Good returning until September 13th, with privilege of extension until October 2nd.

To Pittsburg, Pa.—October 8th, 9th, 10th, 11th, 12th and 13th, good returning until October 17th, account Knights Templar Triennial Conclave. Return limit may be extended until October 31st.

During the excursion season special rates will also be in effect via Pennsylvania Lines for special and local events. For particular information, please apply to nearest Ticket Agent of the Pennsylvania Lines, or address C. L. Kimball, Assistant General Passenger Agent, Cleveland, Ohio.